



Calhoun: The NPS Institutional Archive
DSpace Repository

Theses and Dissertations

1. Thesis and Dissertation Collection, all items

2005-03

Modernization of the Indian Air Force: security implications for South Asia

Dominguez, Edgar M.

Monterey, California. Naval Postgraduate School

<http://hdl.handle.net/10945/2267>

This publication is a work of the U.S. Government as defined in Title 17, United States Code, Section 101. Copyright protection is not available for this work in the United States.

Downloaded from NPS Archive: Calhoun



Calhoun is the Naval Postgraduate School's public access digital repository for research materials and institutional publications created by the NPS community. Calhoun is named for Professor of Mathematics Guy K. Calhoun, NPS's first appointed -- and published -- scholarly author.

Dudley Knox Library / Naval Postgraduate School
411 Dyer Road / 1 University Circle
Monterey, California USA 93943

<http://www.nps.edu/library>



NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

**MODERNIZATION OF THE INDIAN AIR FORCE:
SECURITY IMPLICATIONS FOR SOUTH ASIA**

by

Edgar M. Dominguez

March 2005

Thesis Advisor:
Second Reader:

Peter R. Lavoy
Feroz Khan

Approved for public release; distribution is unlimited

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE March 2005	3. REPORT TYPE AND DATES COVERED Master's Thesis	
4. TITLE AND SUBTITLE: Modernization of the Indian Air Force: Security Implications for South Asia			5. FUNDING NUMBERS	
6. AUTHOR(S) Edgar M. Dominguez				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited			12b. DISTRIBUTION CODE	
13. ABSTRACT (maximum 200 words) <p>This thesis analyzes the Indian Air Force's (IAF) robust modernization campaign and explores why the IAF is on the path to transforming itself from an air force dedicated to air defense to one capable of global force projection. The stunning examples of airpower in the two Gulf Wars, Kosovo, and Afghanistan proved to the Indian leadership the value of modern airpower. Thanks to the amazing growth of the Indian economy, the IAF is gradually acquiring the weapon systems characteristic of a global aerospace force. Pakistan and China are concerned about the motivations behind IAF's modernization efforts and already have begun to improve their own air capabilities in response to any conventional or nuclear contingency. The responses of Pakistan, in particular, indicate the lowering of the nuclear threshold in South Asia. On the other front, a potential arms race between India and China is anticipated.</p> <p>The United States may be able to neutralize the damaging effects of India's military build-up by increasing its arms exports to both India and Pakistan. Specifically, the sale of American F-16s to both countries would fortify bilateral relation with the United States, maintain the fragile security balance in South Asia, and minimize China's influence in the region.</p>				
14. SUBJECT TERMS Modernization, Indian Air Force, Pakistan Air Force, People's Liberation Army Air Force, U.S.-Indian relations, U.S.-Pakistani relations, SU-30MKI, South Asia, limited war.			15. NUMBER OF PAGES 119	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL	

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release; distribution is unlimited

**MODERNIZATION OF THE INDIAN AIR FORCE:
SECURITY IMPLICATIONS FOR SOUTH ASIA**

Edgar M. Dominguez
Captain, United States Air Force
B.A., United States Air Force Academy, 1996

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF ARTS IN NATIONAL SECURITY AFFAIRS

from the

**NAVAL POSTGRADUATE SCHOOL
March 2005**

Author: Edgar M. Dominguez

Approved by: Peter R. Lavoy
Thesis Advisor

Feroz Khan
Second Reader

Douglas Porch
Chairman, Department of National Security Affairs

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

This thesis analyzes the Indian Air Force's (IAF) robust modernization campaign and explores why the IAF is on the path to transforming itself from an air force dedicated to air defense to one capable of global force projection. The stunning examples of airpower in the two Gulf Wars, Kosovo, and Afghanistan proved to the Indian leadership the value of modern airpower. Thanks to the amazing growth of the Indian economy, the IAF is acquiring the weapon systems characteristic of a global aerospace force. Pakistan and China are concerned about the motivations behind IAF's modernization efforts and already have begun to improve their own air capabilities in response to any conventional or nuclear contingency. The responses of Pakistan, in particular, indicate the lowering of the nuclear threshold in South Asia. On the other front, a potential arms race between India and China is anticipated.

The United States may be able to neutralize the damaging effects of India's military build-up by increasing its arms exports to both India and Pakistan. Specifically, the sale of American F-16s to both countries would fortify bilateral relation with the United States, maintain the fragile security balance in South Asia, and minimize China's influence in the region.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

I.	INTRODUCTION	1
A.	INDIA’S INCREDIBLE MODERNIZATION PROGRAM: A THREAT TO STABILITY IN SOUTH ASIA.....	1
B.	SIGNIFICANCE OF STUDY	3
C.	INDIA’S THREAT PERCEPTION OF PAKISTAN AND CHINA.....	4
	1. India’s Threat Perception of Pakistan.....	5
	2. India’s Threat Perception of China.....	8
D.	ORGANIZATION OF THE STUDY.....	9
	1. Modernization of the IAF (Chapter II)	10
	2. Pakistani Reaction: Reviving the PAF (Chapter III).....	10
	3. Chinese Reaction: Modernizing the PLAAF (Chapter IV)	11
	4. Conclusion (Chapter V)	11
E.	CONCLUDING REMARKS.....	11
II.	INDIAN AIR FORCE MODERNIZATION	15
A.	INTRODUCTION	15
B.	THE IAF’S ROBUST MODERIZATION CAMPAIGN	16
	1. Jet Trainer and Combat Fighter Upgrades.....	17
	2. UAVs.....	19
	3. Viable Air Defense System.....	20
C.	IAF SU-30 MKI – AIR SUPERIORITY IN SOUTH ASIA	21
	1. Conventional Role for Su-30MKI.....	23
	2. Nuclear Role for Su-30MKI.....	26
D.	IAF PHALCON AIRBORNE EARLY WARNING SYSTEM: EXPANDING INDIA’S ISR CAPABILITIES	31
	1. Conventional Role for the Phalcon Airborne Early Warning System.....	32
	2. Nuclear Role for the Phalcon Airborne Early Warning System ..	33
E.	IAF IL-78 AIR-TO-AIR REFUELER	36
	1. Conventional Role for Il-78 Air- to- Air Refueler.....	38
	2. Nuclear Role for Il-78 Air- to- Air Refueler.....	40
F.	U.S. SECURITY INTERESTS IN SOUTH ASIA	41
G.	CONCLUSION	44
III.	PAKISTANI REACTION: REVIVING THE PAKISTANI AIR FORCE	47
A.	INTRODUCTION	47
B.	HISTORY AND DEVELOPMENT OF THE PAF	48
	1. Origins of the PAF and Cold War Influences (1947-1979).....	48
	2. Evolution of PAF during the Soviet Occupation of Afghanistan (1979- 1989)	49
	3. PAF Under-Construction (1989-2001).....	50
	4. The End of Parity with the IAF (1990-2001).....	51
C.	PRESENT AND FUTURE PAF DEVELOPMENT.....	53

1.	Learning from the Kargil Conflict and the 2001/2002 Crisis	53
2.	The PAF's Air Defense and Nuclear Roles.....	55
3.	Increased Defense Ties with China to Modernize the PAF	56
D.	EXTERNAL INFLUENCES ON THE PAF.....	58
1.	The State of Pakistan after 9/11.....	58
2.	U.S.-PAF Relations after 9/11: F-16s to the PAF?	59
3.	PAF Concerns and Other Possible Acquisitions	63
E.	CONCLUSION	64
IV.	CHINA'S RESPONSE TO IAF'S MODERNIZATION EFFORTS.....	67
A.	INTRODUCTION	67
B.	CHINA'S THREAT PERCEPTION AND SINO-INDIAN TIES.....	68
1.	China's Present Threat Perception and Outlook on Global Nuclear Weapons Development.....	69
2.	China's Reaction to India's 1998 Nuclear Tests and Current Sino-Indian Diplomatic Ties	70
3.	Beijing's Economic Ties with New Delhi.....	72
4.	Beijing's Military Relationship with New Delhi.....	73
5.	Summing Up China's Threat Perceptions of South Asia – India on the Mind	74
C.	ASSESSING CHINA'S NUCLEAR CAPABILITY VERSUS INDIA	74
1.	China's Nuclear Doctrine and Strategy	75
2.	China's Nuclear Capability	75
3.	India's Nuclear Doctrine.....	77
4.	India's Nuclear Capabilities Versus China	78
5.	China's Nuclear Capabilities Far Surpass Those of India's.....	79
D.	COMPARING THE PEOPLE'S LIBERATION ARMY AIR FORCE TO THE INDIAN AIR FORCE	80
1.	PLAAF Doctrine and Strategy	80
2.	PLAAF Conventional Capabilities	81
3.	IAF Doctrine and Strategy.....	83
4.	IAF Conventional Capabilities	83
5.	India Capable of "Winning the Skies" Versus China	85
E.	CONCLUSION	86
V.	CONCLUSION.....	87
A.	INTRODUCTION	87
B.	FINDINGS	87
C.	IMPLICATIONS AND RECOMMENDATIONS.....	89
	LIST OF REFERENCES	93
	INITIAL DISTRIBUTION LIST	103

LIST OF FIGURES

Figure 1.	Map of Jammu and Kashmir	6
Figure 2.	IAF Jaguar in Exercise Cope Thunder.....	19
Figure 3.	View of Su-30 MKIs	22
Figure 4.	India's Strategic Nuclear Reach from Jodhpur	29
Figure 5.	India's Strategic Nuclear Reach from Tezpur.....	31
Figure 6.	PLAAF A501 Airborne Early Warning Aircraft Observed Over Nanjing, China.....	35
Figure 7.	IAF Locations Throughout India.....	37
Figure 8.	IAF Il-78 Mid-air Refueling of Two IAF Su-30MKIs.	38
Figure 9.	Comparison of the IAF and PAF from 1980 until 2000	52
Figure 10.	PAF Joint Strike Fighter (JF-17).....	57
Figure 11.	India's Strategic Nuclear Reach from Tezpur.....	79

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF TABLES

Table 1.	Performance/capability comparison of IAF Su-30 MKI to the Russian/Chinese Su-30MK (J-11) and American F-15E.....	25
Table 2.	Comparison of India (Top) and Pakistan's (Bottom) Nuclear Delivery Systems	28
Table 3.	Chinese Nuclear Forces, as of January 2003 (Range in Kilometers)	36
Table 4.	US Assistance to India, FY 2001-2004 (in millions of US Dollars) and Brief History of US-Indian Security Ties	43
Table 5.	United States Assistance to Pakistan	61

THIS PAGE INTENTIONALLY LEFT BLANK

ACKNOWLEDGMENTS

The author would like to personally thank Dr. Peter Lavoy and Feroz Khan for their guidance and encouragement in the completion of this thesis. A special thanks also goes to the Institute of Defense Studies and Analysis and the Observers Research Foundation in New Delhi, India for their insight on this project. I would also like to articulate my appreciation to my Pakistani colleagues at the Naval Postgraduate School, who provided invaluable experiences and recommendations on this subject.

Thank you *Guapa* for your friendship, love, and incredible spirit. Finally, I want to express my extreme gratitude to my family, Mami, Papi, Michelle, and Maria, for their *unconditional* love and support through a very tough year...I truly could not have done it without you.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

A. INDIA'S INCREDIBLE MODERNIZATION PROGRAM: A THREAT TO STABILITY IN SOUTH ASIA

With a massive population and thriving economy, India is destined to become a world power. The United States recognizes the strategic significance of India and is seeking measures to improve its bilateral relationship with this emerging Asian power.¹ In order to become more respected and influential in the international arena, India has taken matters in its own hands by strengthening its military; specifically, India has begun one of the most robust Air Force modernization campaigns in modern history.² The Indian civilian and military leadership observed the debilitating impact of airpower in subduing the enemy without committing heavy ground forces during the two Gulf Wars, Kosovo, and Afghanistan.³ As a result of these testaments to modern airpower superiority, the former Chief of the Indian Air Staff, Air Chief Marshal S Krishnaswamy made the decision to “make the Air Force lean and lethal,” emphasizing technology to improve combat effectiveness and defeat potential enemies in modern warfare.⁴ Perhaps the greatest threat to peace on the subcontinent is not nuclear weapons, but India’s massive military modernization program. The modernization of the Indian Air Force (IAF) enhances India’s war fighting capabilities and increases its international prestige as an emerging global military power but severely threaten Pakistan’s security and China’s status as the strongest airpower in Asia.

The modernization of the IAF enhances India’s war-fighting capabilities but threatens Pakistan, which will improve its nuclear weapons program and China, which

¹ On 10 February 2005, U.S. House Representative, Frank Pallone, founder of the Congressional Caucus on India, introduced a ‘Sense of Congress’ legislation, representing the U.S. House of Representative’s first official support of India’s bid to earn a seat on the United Nations Security Council (UNSC), so that it can be respected as an equal power to countries such as the United States, Great Britain, France, Russia, and China. “Turning the Tide: India Inches Closer to UNSC Seat,” *The Economic Times*, 10 February 2005, <http://economictimes.indiatimes.com/articleshow/1017425.cms>.

² India’s modernization programs for the Indian Air Force (IAF) over the last ten years have made the IAF the fourth largest air force in the world. From “Air Force, India,” *Jane’s Sentinel Security Assessment*, 01 Feb 2005, www.janes.com. Last accessed January 2005.

³ Lt. General RK Jasbir Singh, ed., *Indian Defence Yearbook 2004* (Dehra Dun, India: Natraj Publishers, 2004), 330.

⁴ *Ibid.*

will modernize its antiquated air force to compete with India for regional power. Conversely, the reaction of both Pakistan and China depend heavily on the pace of the IAF's modernization. Despite the vast weapon acquisitions made by the IAF in recent years, the success of the IAF's modernization depends on the proper integration of these new weapon systems and the ability of the IAF to adapt new tactics, techniques, and procedures. The IAF is in a state of transformation and is unable to simultaneously defend itself in a conventional air war against Pakistan and China.

Today, the IAF is capable of defending its territory and gaining air superiority versus Pakistan in a conventional war. The IAF will not risk an all out air war versus its neighbor because it is unable to detect and intercept Pakistan's highly mobile nuclear ballistic missiles. For the next ten years, one can expect relative stability between India and Pakistan.⁵ However, in the next ten to fifteen years, the IAF's advanced combat fighters, Intelligence, Surveillance, and Reconnaissance (ISR) platforms and aerial refueling capabilities may embolden India to conduct pre-emptive attacks versus strategic Pakistani targets thereby lowering the nuclear threshold in the subcontinent.⁶

The moderate pace of modernization in the People's Liberation Army Air Force (PLAAF) is geared more towards its ability to seize Taiwan than to defeat India in any future conflicts.⁷ While the PLAAF is modernizing its forces at a slower pace than and the IAF, it will threaten India's ability to become the major regional military power in Asia over the next twenty years. The potential for any border conflicts similar to the 1962

⁵ For the purposes of this thesis, stability in South Asia is defined more in line with crisis stability theory. According to Robert Powell's article "Crisis Stability in the Nuclear Age," *American Political Science Review*, Vol. 83, No. 1, March 1989, the logic of crisis stability implies that an international system in which offense is dominant is less stable than one in which defense is dominant, 62. In the case of South Asia, India's massive modernization program is creating a hostile offensive capability that threatens stability by contradicting the traditional defensive doctrines of both countries.

⁶ George K. Tanham, *Indian Strategic Thought: An Interpretive Essay* (Santa Monica: RAND, 1992), 63. Tanham makes a convincing argument that it is not a great leap from an Indian offensive defense or preemption to thinking offensively since some modern weapons encourage offensive thinking. Irrespective of the strategic intentions of India's current leadership, India is developing a capacity to execute offensive military operations.

⁷ David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects* (Berkeley: University of California Press, 2002), 307. Shambaugh argues that the majority of the PLA's modernization efforts are taking place to prepare China for potential tensions and conflicts with Taiwan. Shambaugh cites the 6 March 2000 statement by *Jiefangjun Bao*, the PLA's daily newspaper that read, "Taiwan independence means war and separation will lead to no peace...the People's Liberation Army's million of troops stand in combat readiness, are on high alert, and will never allow and sit idly by for any attempt to split China to succeed," to support his argument.

Sino-Indian War remain remote for the next twenty years but the development of both air forces threatens to further destabilize the already fragile security dynamic in Asia for the foreseeable future.

B. SIGNIFICANCE OF STUDY

The incredible pace of IAF modernization threatens the stability of South Asia over the long-term since its newfound technological capabilities may result in an offensive-oriented doctrine that may lower the nuclear threshold a propos Pakistan while sparking a potential arms race with China. Therefore, this thesis captures the major modernization upgrades taking place in the Indian Air Force (IAF) and will allow American policymakers and defense planners to better understand how these capabilities may destabilize the region. The reaction of Pakistani and Chinese air forces toward the IAF's modernization efforts will reveal the concern both countries share in respect to India's growing conventional and unconventional capabilities. The causes and effects inherent with the modernization of the IAF need to be explored and identified since the IAF is the second largest air force in Asia (China currently possesses the region's largest air force), and could alter the balance of power in the region by challenging China's regional hegemonic status.⁸ If American policymakers and defense planners can fully grasp the true vision of the IAF, the United States may be able to encourage a cooperative, regional security arrangement that could potentially diffuse the tense security situation with Pakistan while avoiding an arms race with China. Furthermore, if the U.S. Department of Defense (DOD) can formulate a coherent military strategy with India, the United States may be able to free up military resources in the Pacific Command (PACOM) Area of Responsibility (AOR). By engaging India as an equal strategic partner, the United States may be able to rely upon India as a counterbalance to China's military strength in the region, freeing up valuable air, land, and sea assets dedicated to monitoring the China-Taiwan situation towards fighting the War on Terrorism.

While it is important to improve military ties with India, it is also important for U.S. policymakers and defense planners to comprehend why the IAF's modernization challenges the United States' long-held claim as the world's most potent and lethal air

⁸ Marcy Agmon and George K. Tanham, *The Indian Air Force: Trends and Prospects* (Santa Monica, California: RAND, 1995), p. x.

force. In terms of U.S. defense spending, this thesis highlights the importance of pursuing advanced weaponry for future conflicts. Specifically, the rapid, technological development of the IAF explained here are designed for the U.S. Congress to take note of a militarily strong India and re-evaluate its proposed funding cuts for the United States Air Force's most advanced combat fighter of the future, the F/A-22 Raptor.⁹ The United States has always been at the forefront of aviation innovation, but continued to cuts to the Air Force's next generation fighter may have catastrophic repercussions for America's national security in any large-scale conventional or nuclear war that may present itself.

C. INDIA'S THREAT PERCEPTION OF PAKISTAN AND CHINA

In order to better understand the modernization efforts of the IAF, it is first necessary to explore India's threat perception of both Pakistan and China. India continues to modernize its air force so it can defeat Pakistan in any future limited wars (such as Kargil) while maintaining a credible minimum deterrent with the capability and intent to deliver nuclear weapons from the air. By modernizing its air force and tailoring it to conduct rapid operations, hitting targets with precision and lethality over a wide or restricted area, India believes that is more capable of deterring and coercing its immediate enemy, Pakistan.¹⁰

India's threat perception with China is somewhat different. Due to its large size, population, conventional military strength, and nuclear capabilities, India perceives China as its major external military threat, though it has not proved to be as actively hostile to India as has Pakistan.¹¹ In order to match China's quantitative military capabilities, India continues to make significant strides in the modernization of its own air force to close the gap on the regionally ambitious China. Thus, India's primary motivation in modernizing

⁹ Laura M. Caolarusso examines the future of the U.S. Air Force in her article entitled, "The Fight to Stay on Top," *Air Force Times*, 07 February 2005. She argues that the U.S. Air Force is in jeopardy of losing its status of air dominance and questions how prepared it is to fight the next war. For example, just as the F/A-22 Raptor nears full-rate production, the Pentagon is now considering cuts that would reduce the Air Force's next generation fleet to 180 planes yet senior ranking service officials still insist that they need at least 381 Raptors to maintain air dominance.

¹⁰ Air Marshal Vinod Patney (Retd), "Modernizing the Armed Forces and Defence Budget," *Peace and Conflict*, Vol. 7, No. 9, September 2004, 3.

¹¹ Tanham, *Indian Strategic Thought: An Interpretive Essay*, 35-36.

its air force is to eventually deter a strategic Chinese nuclear attack while acquiring advanced aircraft to match China's modern conventional capabilities.

India possesses different threat perceptions of Pakistan and China based on historical experiences and future expectations. It is vital for U.S. policy makers to understand these respective perceptions and accurately predict how India's modernization and U.S. engagement turn these perceptions into realities. For instance, if the United States supports India as a counter weight to China, bolstering India's already robust military modernization, this directly threatens the fragile strategic balance in South Asia.¹² Balancing South Asian security is challenging and more immediate than a perceived future rivalry between India and China.¹³ The transfer of advanced technologies to India based on the perceived Sino-Indian rivalry may end the "ugly stability" in South Asia as Pakistan is forced to develop dangerous "counter veiling" strategies (for example, increasing Pakistan's arsenal of Short Range Ballistic Missiles, SRBMs) versus India.¹⁴ The following sections provide more detail into the historical and current Indian threat perceptions of Pakistan and China, analyzing the influence of such perceptions on South Asian security.

1. India's Threat Perception of Pakistan

India remains suspicious of a Pakistani state with a long period of authoritarian military rule that has arrested the development of democratic institutions in this country since its partition with India in 1947.¹⁵ The most contentious issue between both countries is the status of Jammu and Kashmir. Pakistan was created as the homeland for the Muslims of the subcontinent; therefore, Pakistan remains committed to incorporating the Muslim-majority state of Jammu and Kashmir into its domain (reference Kashmir map below).¹⁶ As the largest democracy in the world, India is committed to the vision of civic nationalism and will do everything in its power to thwart Pakistan's goal of obtaining

¹² Feroz Khan (Brigadier General (Ret.), Pakistan Army), discussion with author, 24 March 2005.

¹³ Ibid.

¹⁴ Ibid.

¹⁵ Sumit Ganguly, *Conflict Unending: India-Pakistan Tensions Since 1947* (New York: Colombia University Press, 2001), 7.

¹⁶ Ibid, 5.

Jammu and Kashmir so that it can demonstrate that all communities, regardless of religious orientation, can thrive under India's secular dispensation.¹⁷ Thus, India is committed to maintaining control of Jammu and Kashmir because if India were to lose Jammu and Kashmir to Pakistan this may embolden other Indian states to break away from Delhi. Since Pakistan threatens the legitimacy of a democratic and secular Indian state, India perceives Pakistan as its greatest immediate security threat.



Figure 1. Map of Jammu and Kashmir¹⁸

¹⁷ Sumit Ganguly, *Conflict Unending: India-Pakistan Tensions Since 1947*, 7.

¹⁸ "Kashmir Region" graph retrieved from the CIA's website, www.cia.gov. Last accessed January 2005. Note Line of Control separating Pakistan-controlled Kashmir from Indian-controlled Kashmir

In terms of military doctrine toward Pakistan, “offensive defense” summed up the approach India adopted in past wars (in 1947-48 and again in 1965); strong defensive lines were formed in areas of importance, with adequate forces to break up an enemy force that might manage to penetrate these defenses.¹⁹ Furthermore, the IAF argued that its first goal should always be to win the air war before fully supporting the ground war.²⁰ Since Pakistan has historically infiltrated insurgents into the contested region of Kashmir, India is determined to maintain a conventional edge to Pakistan’s armed forces, capable of defeating Pakistan forces not only in Kashmir, but also in Pakistan territory, if necessary. While Kashmir did not play a major role in the 1971 war fought over the separation of East Bengal from Pakistan, Kashmir has been the major source for conflict between India and Pakistan since 1989.²¹

India’s expectation of stability in South Asia, which was assumed to follow after Pakistani nuclear weapons neutralized Indian conventional superiority, has not been fulfilled; instead, Pakistan has been encouraged to take greater risks in Jammu and Kashmir that necessitated a strong Indian military response in the 1999 Kargil conflict.²² If anything, India’s perception of Pakistan as a major security concern increased with the introduction of nuclear weapons in 1998. Recently, Pakistan has been forced to deal with rising Islamic extremism, nuclear weapons proliferation, and a weak economy, only heightening Indian fears of a “failed” Pakistani state that may accelerate the proliferation of nuclear weapons to hostile states (or non-state actors), and serve as a base for radical Islamic movements that target Indian Muslims.²³ In respect to Pakistan, India believes that it needs to continue to modernize its air force so it can clearly defeat Pakistan in any future limited wars (such as Kargil) while maintaining a credible minimum deterrent with the capability and intent to deliver nuclear weapons from the air.

¹⁹ V.R. Raghavan, “Limited War and Nuclear Escalation in South Asia,” *The Nonproliferation Review*, Vol. 8, No. 3 (Fall-Winter 2001): 8.

²⁰ Ibid.

²¹ Stephen Philip Cohen, *India: Emerging Power* (Washington, D.C.: Brookings Institution Press, 2001), 217.

²² Raghavan, “Limited War and Nuclear Escalation in South Asia,” 16.

²³ Cohen, *India: Emerging Power*, 227.

2. India's Threat Perception of China

Due to its large size, population, conventional military strength, and nuclear capabilities, India perceives China as its major external military threat, though it has not proved to be as actively hostile to India as has Pakistan.²⁴ India is extremely concerned with China's geo-political objectives in Asia.²⁵ Specifically, India understands the importance of energy since it is the key to continued and sustained economic growth for both countries.²⁶ China's monumental demand for the world's valuable energy resources threatens India's long-term economic development. Therefore, it is in Indian's vital national interests to protect the oil that travels from the Persian Gulf to India and onwards to the Straits of Malacca. Another precarious concern for India is China's long-standing support for India's main enemy, Pakistan.²⁷ Beijing's military and economic support for Pakistan is a major source of friction in Sino-Indian relations; Chinese support for Pakistan's Kashmir position has only added to the discomfort of India's leaders.²⁸ Historical high level talks between Indian and Chinese diplomats have mostly been symbolic, having no affect on India's threat perception of its neighbor to the North.

India's perception of China will not improve until the following issues are properly addressed: border issues, Chinese ties with Pakistan (as well as Burma and Bangladesh), India's hosting of the Dalai Lama, and trade.²⁹ Without a quick resolution of these major issues, and some transparency in each other's military and nuclear weapons programs, it will be difficult for India to trust China as it did prior to the 1962 Sino-Indian War. Since this war, China remains India's long-term security concern, especially in the realm of

²⁴ Tanham and Agmon, *The Indian Air Force: Trends and Prospects*, 35-36.

²⁵ In Keith Bradsher's article, "India Joins China in Stepped-Up Thirst for Oil," *International Herald Tribune Online*, <http://www.iht.com/articles/2005/02/17/news/energy.html>. Last accessed February 2005. Bradsher references India's minister of oil and natural gas who argues that India and other Asian nations need to pursue their own interests in oil markets amidst China's ravenous thirst for oil.

²⁶ Bradsher, "India Joins China in Stepped-Up Thirst for Oil."

²⁷ Robert G. Sutter, *Chinese Policy Priorities and Their Implications for the United States* (Maryland: Rowman and Littlefield, 2000), 134.

²⁸ Kronstad, K. Alan, Foreign Affairs, Defense, and Trade Division, "India-U.S. Relations," Congressional Research Service, The Library of Congress, 3 December 2003, CRS 4.

²⁹ Sutter, *Chinese Policy Priorities and Their Implications for the United States*, 135-136.

defense spending.³⁰ Nehru even realized the long-term security threat of China after the 1962 war as his 1964 five year military modernization plan included the stabilization of the IAF at forty-five squadrons, re-equipping it with modern aircraft.³¹ In order to meet China's quantitative military capabilities, India continues to make significant strides in the modernization of its own air force to close the gap on the strategically ambitious China. While India is still unable to compete with China on a nuclear level (since India cannot target Beijing) it is improving its strategic reach from the air by acquiring air-to-air refuelers. Since China's nuclear Mid-Range Ballistic Missiles (MRBM) and Intermediate-Range Ballistic Missiles (IRBM) far outnumber India's, India's best resort in any potential nuclear conflict is with the aerial delivery of nuclear weapons. Thus, India's primary motivation in modernizing its air force is to eventually deter China from attacking India with a strategic nuclear strike option from the skies while acquiring advanced aircraft to match China's modern conventional air capabilities.

D. ORGANIZATION OF THE STUDY

In addition to India's threat perception of its neighbors, this chapter also assesses the current U.S.-India security relationship in respect to India's massive military modernization program. Chapter II (Modernization of the IAF) of this thesis explores the "how" and "why" of the IAF's modernization program. Chapter III (Pakistani Reaction: Reviving the Pakistani Air Force, PAF) inspects the history of the PAF and the PAF's reaction to IAF modernization, while Chapter IV (Chinese Reaction: Modernizing the People's Liberation Army Air Force, PLAAF) examines China's unique threat perception of India, its nuclear capabilities, and finally, the PLAAF's reaction to IAF modernization. By assessing the reactions of India's two chief rivals, Pakistan and China, I explain how the IAF's aggressive modernization program will escalate tensions throughout the region as all three countries strive to upgrade their air forces in order to better defend themselves. However, if America can manage the security dilemma in South Asia through conflict mediation and resolution, treating both India and Pakistan as equals throughout the peace process, then the negative effects of the IAF's rapid modernization (the lowering of the

³⁰ Peter R. Lavoy, *Learning to Live with the Bomb? India and Nuclear Weapons, 1947-1974* (New York: Palgrave-MacMillan, forthcoming), 190.

³¹ Ibid, 197

nuclear threshold in South Asia and a potential arms race with China) may be avoided. A brief description of each chapter is provided below.

1. Modernization of the IAF (Chapter II)

The IAF is modernizing because modern warfare requires a technologically advanced air force, because India wants to be able to deter and defeat Pakistan in any potential conflict and because India wants to deter and match China in any future confrontations. The IAF began its program of modernization in the mid-1990s. Since then, the IAF has made significant progress in acquiring and developing sophisticated aircraft weapon systems to obtain complete conventional and possibly nuclear superiority with the PAF while closing the gap on conventional capabilities with the PLAAF. The specific goals desired by the Indian civilian leadership are identified by the IAF's latest acquisitions: the Sukhoi Su-30MKI advanced combat fighter, the Phalcon airborne early warning system, and the IL-78 air-to-air refueler. While particular attention is paid to these three major weapon systems, other upgrades to the IAF are explored, such as the PINE radar system, upgrades to the Mig-21 Bison and the possible acquisition of the Mirage 2000-5.

2. Pakistani Reaction: Reviving the PAF (Chapter III)

In Chapter III I explore the response of the PAF to IAF modernization. It is more than likely that Pakistan will strengthen its military cooperation ties with China to modernize its air force. The reason for this is quite simple: the gap between the PAF and IAF today is remarkable. As of the year 2000, the India: Pakistan fixed wing combat aircraft ratio was 2.67:1.³² Pakistan remains economically and politically constrained, and will be unable to upgrade its air force's conventional capabilities in the immediate future. Instead, Pakistan gradually will improve its air force by exploring the asymmetric advantages of its aerial nuclear delivery capabilities and increasing defense ties with China.

³² Rodney W. Jones, "Strategic Stability and Conventional Force Imbalance: Case of South Asia," *Policy Architects International*, http://www.bradford.ac.uk/acad/sassu/publications/StrStab&ConvAsymmetry_Bradford_2.pdf, 6. Last accessed January 2005.

3. Chinese Reaction: Modernizing the PLAAF (Chapter IV)

In Chapter IV I measure the Chinese reaction to IAF modernization by analyzing China's threat perception of India, China's nuclear program, and the current modernization efforts of the PLAAF. The main goal of this chapter is to determine whether or not China perceives IAF modernization as a significant threat. My assessment is that China is relatively indifferent to IAF modernization since China perceives the United States, not India, as its primary opponent in the region. Furthermore, China is more concerned with reclaiming Taiwan so the structure of its air force is more concentrated on its coastal region than with its southern border along the Himalayas. Regardless, China will continue to provide Pakistan with arms to help it counter Indian conventional military superiority.

4. Conclusion (Chapter V)

In the conclusion of my thesis my evidence supports my major argument that the modernization of the IAF is the greatest threat to stability in South Asia over the long term. The major policy recommendation from this chapter is to advise American policymakers and defense planners to "proceed with caution" in South Asia and be extremely careful in militarily supporting India so as not to upset the precarious security balance in South Asia. Military ties will continue to strengthen between both Pakistan and China as both countries seek to minimize the influence of both India and the United States in South Asia.

E. CONCLUDING REMARKS

In addition to the United States' security relationship with India, one must also take into consideration India's emergence as a global air force. With the successes in the Joint Indo-American and multi-national air exercises, Cope India and Cope Thunder, the IAF now perceives itself as a world-class air force³³ Also, the IAF conducted bilateral air

³³ According to the Indian Air Force's official homepage at <http://indianairforce.nic.in/Cope.htm> the exercise Cope India was a success from day one as the U.S. Air Force were very impressed by the IAF's flying capabilities and professionalism. According to the team leader of the U.S. Air Force contingent, Col. Greg Newbech, "What we've seen in the last two weeks is that the IAF can stand toe-to-toe with the best Air Force in the world." Last accessed January 2005.

exercises with the South African and Singaporean air forces.³⁴ India is content to increase training with other air forces since this supports its foreign policy of multi-lateralism. This will limit the United States' influence on the development of the IAF as the history of Indo-American relations has led the Indian government to view the United States as an inconsistent geo-political partner. Since the IAF can only conduct a limited number of exercises a year, this may hurt the emerging defense relationship between the United States and India as India looks to keep its options open and train with other competitive air forces. For example, due to a strong relationship in respect to arms sales, there is a strong possibility that India may conduct air exercises with Israel in the immediate future.

With the modernization of the IAF via the specific acquisitions aforementioned, India has noticeably achieved a conventional edge over Pakistan, its immediate rival, while qualitatively catching up with the PLAAF. After observing the success of the USAF in the Persian Gulf War (and noting the importance of air superiority in any land war), the IAF decided to pursue the Su-30MKI, Phalcon AWACS, and Il-78 air-to-air refuelers as the force multipliers necessary to defeat the PAF and match the PLAAF in any future conventional or limited wars. While all three of these weapon systems could act in unison to conduct the successful air delivery of a nuclear weapon into Pakistan, the IAF will first concentrate on utilizing these platforms in a conventional role (which may still take another ten years for the IAF to operate and integrate successfully). The only exception to the use of these weapons systems in a conventional role may be the IAF's utilization of the Su-30MKI to deliver a nuclear weapon into Pakistan as a secondary strategic strike option. Due to China's vast strategic nuclear force advantage over India, it is clear that India's primary motivation for acquiring these systems is to match the PLAAF in any conflict scenario in the Himalayas. Ironically, the training provided by the USAF

³⁴ Exercise Golden Eagle was a joint Indian and South African air exercise held in South Africa. Information retrieved from Government of India's High Commission website, http://indiahighcom.intnet.mu/prl_7.htm. Last accessed January 2005. The inaugural bilateral exercise, named SINDEK 04, between the Republic of Singapore Air Force (RSAF) and the IAF was held at Gwalior Air Force Station in Western India from 11 to 27 October 2004. From the 16 October 2004 article entitled, "Singapore and India Hold Inaugural Bilateral Air Exercise," from the RSAF's official website <http://www.mindef.gov.sg/rsaf/alert/ne-na-tpl.asp?newsid=121>. Last accessed January 2005.

to the IAF may further destabilize South Asia since Pakistan will perceive India's advanced weapon systems and training as a threat to its own security, forcing Pakistan to lower its nuclear threshold.

Alternatively, China may perceive the IAF's upgrades and exercises with the USAF as a threat to China's prestige and influence, sparking possible arms race between these two Asian rivals. In addition, the IAF's modernization, with its sophisticated weapon acquisitions and exercises with the USAF, may provoke China and Pakistan to reinforce their security ties as a counter-balance to a perceived Indo-American security alliance. As the IAF continues to modernize and improve its operational capabilities, the United States should not only recognize the government of India's multi-lateral approach to international relations but the potentially damaging side effects of any future joint-training exercises. Even if tensions do increase, the United States has the capability to influence the security dilemma in South Asia. Therefore, it is unlikely that we will see a major conflict in the South Asia in the immediate future as the United States will make every effort to ensure that Pakistan does not become too weak in respect to India while at the same time, the United States will promote a new defense relationship with India to counterbalance the growing strength of China.

THIS PAGE INTENTIONALLY LEFT BLANK

II. INDIAN AIR FORCE MODERNIZATION

A. INTRODUCTION

The Indian Air Force's modernization program began in the 1980s but experienced serious problems later that decade as the country faced a growing foreign exchange crisis.³⁵ Due to this economic crisis, India implemented economic liberalization reforms in the early 1990s, which in return, revitalized the economy and bolstered the defense budget. Thanks to this increase in defense spending, the IAF has made considerable progress in acquiring and developing sophisticated aircraft weapon systems to obtain complete conventional superiority with the Pakistan Air Force (PAF), while closing the gap on conventional capabilities with the People's Liberation Army Air Force (PLAAF). The scale of the IAF's modernization efforts is monumental since it is targeted at improving all facets of the IAF including Close Air Support (CAS), ISR, precision strike, mid-air refueling and tactical/strategic airlift.

In the past, the IAF failed to modernize because weaponry was imported from several countries and produced from an array of suppliers.³⁶ This avoided allowing a single external power the possibility of influencing India's foreign and defense policy through the withholding of spare parts and technical assistance.³⁷ Further complicating the IAF's modernization is an extremely ineffective defense procurement process, tied down by India's complex bureaucracy of competing interests. Despite its policy of non-alignment throughout the Cold War, India relied upon the Soviet Union for the majority of its defense equipment.³⁸ Over the last ten years, India has begun to look at other vendors and has reinvigorated its indigenous production capabilities to lessen its reliance on Russia and improve its lackluster defense industry. Notwithstanding the poor decisions of past Indian leaders, India has become the world's fourth largest air force and is considered to

³⁵ Chris Smith, *India's Ad Hoc Arsenal: Direction or Drift in Defense Policy* (New York: Oxford University Press, 1994), 132-133.

³⁶ Ibid, 223.

³⁷ Chris Smith argues: "India's defense posture is as unstructured and anarchic as it is profligate," *India's Ad Hoc Arsenal*, 223.

³⁸ According to George K. Tanham and Marcy Agman, *The Indian Air Force: Trends and Prospects* (Santa Monica: RAND, 1995), 81-84, about 60 percent of India's current combat aircraft inventory is of Soviet origin while 80 percent of India's transports and helicopters are of Soviet design.

be a modern and technology driven service.³⁹ Perhaps one of the greatest incentives for modernizing the IAF was the awesome exhibition of air power by the United States in the Persian Gulf War and Kosovo. In response to the clearly demonstrated debilitating impact of airpower in modern warfare, the former Chief of the Indian Air Staff, Air Chief Marshal S. Krishnaswamy expressed his intention of developing a “lean and lethal” air force base on advanced technologies.⁴⁰ On the operational and tactical levels, the goal of the IAF’s recent modernization efforts are to maximize effectiveness by ensuring its aircraft can control the skies, conduct independent strikes, reconnaissance, airlift and combat air support operations.⁴¹ On the strategic level, the IAF is acquiring high-technology (specifically, the Sukhoi Su-30MKI advanced combat fighter, the Phalcon airborne early warning system, and the IL-78 air-to-air refueler) to defend itself against its two greatest threats, Pakistan and China.

The IAF is modernizing because modern warfare requires a technologically advanced air force, because India wants to be able to deter and defeat Pakistan in any potential conflict, and because India wants to deter and match China in any future confrontations. The rest of this chapter is dedicated to analyzing the current modernization efforts taking place in the IAF. After a broad overview of the IAF’s modernization efforts, I focus on the IAF’s acquisition of three hi-tech platforms mentioned above assessing their utility in a conventional and/or nuclear capacity versus Pakistan and China. The overall objective of this chapter is to demonstrate why the IAF’s latest modernization efforts threaten stability in South Asia and may spur a costly arms race between India and China.

B. THE IAF’S ROBUST MODERNIZATION CAMPAIGN

India is acquiring foreign weapons systems to conventionally and unconventionally deter aggressive actions from either Pakistan and/or China while retaining an offensive strike capability (for instance, in a punitive air strike role versus Pakistan during a Kargil-type scenario). This section briefly explains some of the major

³⁹ “Indian Air Force,” *Jane’s Sentinel Security Assessment*. www.janes.com. Last accessed January 2005

⁴⁰ Jasbir Singh, ed. *The Indian Defense Yearbook 2004* (New Delhi: Natraj Publishers, 2004), 330.

⁴¹ Singh, *The Indian Defense Yearbook 2004*, 332.

modernization programs taking place within the IAF including jet trainer and combat fighter upgrades, Unmanned Aerial Vehicles (UAVs), air defense upgrades, and transport aircraft upgrades.

1. Jet Trainer and Combat Fighter Upgrades

Of utmost importance to any major air force is its ability to generate top-notch pilots. The IAF understands the value of training in the best aircraft available and has actively pursued a jet trainer to replace its aging fleet of MiG 21 trainer aircraft. While the MiG-21 fighter is the mainstay of the IAF, about 70 to 80 will be phased out by 2012 and substituted with the British Hawk 132 Advanced Jet Trainer.⁴² It is assessed that 22 Hawk jets will be delivered by BAE Systems while 44 more will be manufactured under license by Indian-owned Hindustan Aeronautics Limited (HAL).⁴³ The training of IAF pilots in the British Hawk AJT have already begun as 20 IAF pilots are currently in the United Kingdom receiving training from BAE Systems.⁴⁴ India should begin receiving the first of its Hawk AJTs prior to the Aero India air show in February 2007 providing the IAF with a long-term improvement to its jet fighter training as pilots will be able to accrue more flight hours and train in a safer aircraft than the accident-prone Mig-21.⁴⁵

While the IAF may have fixed its necessity for a credible jet trainer, it continues to upgrade its various multi-role combat fighters. The IAF has begun to phase out its MiG-23 and MiG-25 aircraft, transferring their roles to the Jaguar and MiG-29.⁴⁶ Due to the massive number of MiG-21s in the IAF inventory, the IAF committed itself to the MiG-21 BIS modernization program that will eventually upgrade 123 Mig-21s into the Mig-21

⁴² As stated by the former head of the IAF, Air Chief Marshall S. Krishnaswamy on 13 Jun 2004 in an interview with the Indo-Asia News Service. "India Air Force to Phase out MiG-21 Trainer Aircraft," *Xinhua News Service Agency*, 14 June 2004, 1.

⁴³ Ibid.

⁴⁴ Eventually, 70 pilots will be trained on the British Hawk AJT. "Britain to Deliver First Hawk to India by Aero India 2007," *Deccan Herald*, <http://deccanherald.com/deccanherald/feb082005/i18.asp>. Last accessed February 2005.

⁴⁵ "Britain to Deliver First Hawk to India by Aero India 2007."

⁴⁶ The IAF currently has 18 MiG-23MF air-defense fighters, 54 MiG-23BN ground-attack aircraft, and 16 MiG-23BN variants optimized for electronic warfare, as well as eight MiG-25s. Pulkit Singh, "India Bolstering Jaguar Fleet, Phasing Out Some Older MiGs," *Journal of Electronic Defense*, October 2002, Vol. 25, Iss. 10, 26.

BIS.⁴⁷ The MiG-21 BIS are under series upgrade with HAL (Nasik Division) and are being fitted with state-of-the-art avionics systems; 64 aircraft have been upgraded by HAL so far.⁴⁸

In addition to the MiG-21 BIS, the Jaguar (reference photo below), a deep-penetration strike fighter, recently proved itself by conducting a transatlantic flight to Alaska to participate in the multi-lateral exercise Cope Thunder.⁴⁹ HAL has also begun significant upgrades to the Jaguar by improving its navigation and weapon aiming performance.⁵⁰ While the indigenously produced Light Combat Aircraft (LCA) continues to experience delays in its actual implementation into the operational IAF, it is still considered as a key element in the IAF's upgraded fleet of combat fighters. Due to the importance of real-time data communications, realized during the American air campaign during Operation Iraqi Freedom, the Aeronautical Development Agency and the Defense Research Development Organization are developing real-time applications and exploring the possibility of outsourcing the IAF's software requirement for the Jaguar and the LCA.⁵¹ In addition to the current combat aircraft in the IAF inventory, the current chief of the IAF, Air Chief Marshall S.P. Tyagi, is actively pursuing a number of aircraft from Lockheed Martin (United States), Dassault Aviation (France), MiG Corporation (Russia), and Grippen (Sweden) as a plan to acquire 125 fighters and phase out 300 MiG-21s by 2007.⁵² Thus, the IAF is attempting to move away from its reliance on Russian aircraft and seeking to produce and upgrade its own jet aircraft either indigenously or with other nations.

⁴⁷ 2002-2003 *Annual Report, Ministry of Defense. Government of India.* Indian Ministry of Defence's official website: <http://mod.nic.in/>, 52. Last accessed March 2005.

⁴⁸ 2003-2004 *Annual Report, Ministry of Defence, Government of India.* Indian Ministry of Defence's official website: <http://mod.nic.in/>, 51. Last accessed March 2005.

⁴⁹ "6 IAF Jaguars To Take Part in 'Cope Thunder 2004,'" *Rediff.com*, 15 June 2004, <http://www.rediff.com/news/2004/jun/15iaf.htm>. Last accessed January 2005.

⁵⁰ 2003-2004 *Annual Report, Ministry of Defence, Government of India*, 82.

⁵¹ Fakir Chand, "IAF Draws Lessons from Gulf War," *Rediff.com*, 27 June 2003, <http://www.rediff.com/news/2003/jun/27iaf.htm>. Last accessed January 2005.

⁵² "IAF Sounds Fighter Makers," *Deccan Herald*, 08 February 2005, <http://deccanherald.com/deccanherald/feb082005/i3.asp>. Last accessed February 2005.



Figure 2. IAF Jaguar in Exercise Cope Thunder⁵³

2. UAVs

UAVs are being increasingly viewed as force multipliers in any conflict since they send real time data and pictures inside enemy territory and can safely evade enemy radars.⁵⁴ Due to the lack of ISR during the Kargil crisis, UAVs became one of the high priority requirements of the IAF.⁵⁵ Thus, the IAF has made a concentrated effort to induct high-quality UAVs into its inventory to improve its ISR capabilities. In support of this effort, the Indian Ministry of Defense (MoD) completed a \$240-million deal for the acquisition of 30 Heron UAVs from Israel's Aircraft Industries along with ground stations, communications equipment, and intelligence-gathering payloads.⁵⁶ This is in

⁵³ Photo accessed at <http://homepage.mac.com/topcover/PhotoAlbum46.html>. Last accessed March 2005. In this photo, the IAF Jaguar is preparing for an aerial refueling,

⁵⁴ Farah Naaz, "Indo-Israel Military Cooperation," *Strategic Analysis: A Monthly Journal of IDSA*, August 2000, Vol. 24, No. 5.

⁵⁵ Ibid.

⁵⁶ The Heron UAV is a medium-altitude, high endurance UAF with a payload capacity of up to 52 hours of continuous operations. The Heron UAVs are being acquired to reach the higher reaches of the disputed Jammu and Kashmir, where Herons already in Indian service have been very successful, according to an Indian MoD official. Pulkit Singh, "India Orders More UAVs From Israel," *Journal of Electronic Defense*, January 2005, Vol. 28, No. 1, 21.

addition to the 120 UAVs India has already purchased from Israel including Searcher-1, Searcher-2, and Heron UAVs.⁵⁷ India's indigenously developed Nishant UAV has not yet been inducted into the Indian armed forces due to technical problems.⁵⁸ Therefore, the IAF will continue to utilize UAVs as a means to fill intelligence gaps, especially in high-altitude contested regions such as the Siachen glacier, until the induction of the Phalcon Airborne Early Warning System.

3. Viable Air Defense System

In order to cover its air defense gaps across its extensive landmass to adequately defend itself from a Pakistani and/or Chinese air and missile attacks, India is pursuing highly capable air defense systems. Of interest to India is the Arrow Weapon System (AWS), an Israeli weapons system that can identify, intercept, and destroy missile launchers at great distances.⁵⁹ The Green Pine radar is an essential part of the AWS (also known as 'Homa' in Israel, which means fence), developed by Israeli Aircraft Industries (IAI), and the one viable solution to air defense from ballistic missiles preferred by the IAF.⁶⁰ The Homa system is designed to simultaneously intercept as many as 14 incoming Theater Ballistic Missiles (TBMs).⁶¹ The Green Pine radar is an electronically scanned, solid state, phased array radar that can detect targets up to ranges of about 500km and is able to track targets up to speeds of 3.000m/s; two Elta Green Pine radar systems were delivered to India as part of the nation's air defense system against ballistic missiles in 2001.⁶² Since the Arrow 2 project is a joint U.S.-Israeli initiative, the United States can deny the export of the Arrow missiles to India. Due to the tensions between Pakistan and India it is unlikely that the United States will allow the export of the Arrow 2 missiles to India despite the United State's support of Ballistic Missile Defense (BMD).

⁵⁷ Pulkit Singh, "India Orders More UAVs From Israel."

⁵⁸ Ibid.

⁵⁹ Jay Bushinsky, "Radar System Sale to India Approved," *The Washington Times*, 02 March 2004, <http://washingtontimes.com/world/20040301-100359-6990r.htm>. Last accessed January 2005.

⁶⁰ Prasun K. Sengupta, "Which Way is India's BMD/AEW System Headed?" <http://www.india defence.com/BMD&AEW.htm>. Last accessed March 2005.

⁶¹ Other critical elements of the Homa System include the Citron Tree battle management center, 1.3 ton Arrow-2 interceptor missile and a containerized 'Hazelnut Tree' launch control center (still not a part of the IAF's inventory). The future integration of an airborne early warning system or UAV would boost the intercept capabilities of Homa. Ibid.

⁶² "Arrow 2 Theater Ballistic Missile Defence System, Israel," *Army-Technology.com*, <http://www.army-technology.com/projects/arrow2/>. Last accessed March 2005.

In addition to the modernization programs mentioned above, the IAF has invested a substantial amount of its funding and resources into the following weapons systems: the advanced Su-30MKI (Russian acronym for Multirole, Commercial, Indian) combat fighter, the Phalcon radar Airborne Early Warning (AEW) system, and the IL-78 air-to-air refueling tanker. After describing these acquisitions individually, it is important to assess exactly why India is acquiring these foreign weapons systems. Therefore, the capabilities of each weapon system will be analyzed to determine who India is most likely to employ these modern weapon systems against and whether or not they intend to apply these weapons in a conventional role, a nuclear role, or both.

C. IAF SU-30 MKI – AIR SUPERIORITY IN SOUTH ASIA

The IAF likes to call the Su-30MKI an Air Dominance Fighter (ADF).⁶³ The IAF decided on the Su-30MKI program in 1996 (when it signed a US \$1.8 billion contract with the Russian defense company, IRKUT) to fulfill the IAF's requirement for a new multi-role fighter with superlative air superiority and ground attack capabilities.⁶⁴ Furthermore, the requirement for an advanced combat fighter to replace the antiquated Mig-21s became urgent as India's indigenously produced Light Combat Aircraft (LCA) fell further and further behind in production. Another factor that influenced India's decision to acquire the Su-30MKI was when China placed an order for the Su-30MK designated the J-11 by Beijing.⁶⁵ The IAF ordered the Indian specific MKI version since it had the capability to contact suppliers in France and Israel for the joint development of key weapons management, radar, and avionics that would give the MKI version an edge over the Chinese J-11.⁶⁶ One of the final requirements for the Su-30MKI included the need to replace the aged and accident-prone Mig-21s in order to compete with and defeat both the Pakistani Air Force's F-16 and the People's Liberation Army Air Force's J-11 in a limited or conventional war. The IAF had to replace the aging Mig-21 jets since they have been

⁶³ Mohammed Ahmedullah, "India Enters Fighter 'Big League.'" *Military Technology*, 27, 2 (February 2003), 24.

⁶⁴ Ibid.

⁶⁵ Ibid.

⁶⁶ Ibid.

involved in at least 250 crashes and 100 pilot deaths since 1991.⁶⁷ Finally, the Su-30 MKI should be capable of delivering nuclear weapons from the air well within the boundaries of both Pakistan and China.⁶⁸



Figure 3. View of Su-30 MKIs⁶⁹

Currently, the IAF operates 18 Su-30K and 22 Su-30MKI fighters.⁷⁰ In order to maintain a competitive advantage over its regional rivals, Pakistan and China, India will not only import Su-30MKIs from Russia but produce them as well. Since HAL has the licensing rights for the indigenous production of the Su-30MKI (agreed upon in the 1996 contract), by 2007-2008 all IAF Su-30MKIs will be exclusively produced in India.⁷¹ Eventually India will produce a total of 140 Su-30MKI fighters between 2004 and 2017 representing the largest contract signed between Russia and India through their military

⁶⁷ “India’s Air Force Scraps Outdated Jets,” *BBC News Online*, 09 November 2002, www.bbc.com.

⁶⁸ Ibid.

⁶⁹ Photos retrieved from the Indian Air Force, Bharatiya Vayu Sena website, <http://www.bharat-rakshak.com/IAF/>. Last accessed January 2005. Su-30MKIs from No. 20 Lightening Squadron in flight over Pune and Yelahanka airfields, respectively.

⁷⁰ “Russia’s Irkut About to Complete Su-30MKI Deliveries to India, Start Production at HAL Enterprises,” English compilation of reports from the website of Moscow Voyennykh Novostey, 11 May 2004. Accessed from the Foreign Broadcast Information System (FBIS) portal at <https://portal.rccb.osis.gov/> on January 2005.

⁷¹ Ibid.

technical cooperation agreement.⁷² In terms of combat capability, the Su-30MKI is fitted with the Bars radar, capable of detecting enemy fighters at a range of up to 130 km in the forward hemisphere, and over 60 km in the rear hemisphere.⁷³ Also, the aircraft is capable of carrying almost the whole range of weapon systems with a total weight of up to eight tons; its range totals 3,000 km without refueling, 5,200 km with one refueling. If India can successfully produce the Su-30MKI indigenously, maintain a respectable pilot training program, and maintenance support program, the IAF will be able to field an advanced multi-role fighter capable defeating Pakistan's and China's most sophisticated combat aircraft in conventional defensive/offensive, air/ground operations.

1. Conventional Role for Su-30MKI

With its mix of firepower, early warning, and maneuverability, the IAF Su-30MKI should be able to defeat any regional air threat in South Asia (reference Table 1, Performance/capability comparison of IAF Su-30 MKI to the Russian/Chinese Su-30MK (J-11) and American F-15E below). In a potential limited and/or conventional war with either Pakistan and/or China, the IAF foresees the Su-30MKI as the key to gaining air superiority. In the 1965 and 1971 Indo-Pakistan Wars, the IAF had no restrictions on the use of offensive airpower; in the 1962 Sino-Indian War and the 1999 Kargil Conflict the use of air power was hedged with various restrictions since the perception was that the full use of offensive air power is fundamentally escalatory.⁷⁴ Regardless, the official IAF doctrine states that during wartime, "The fight for control of the air or air superiority gets first priority in every case."⁷⁵ In terms of any potential air conflict with Pakistan, the IAF already has a two-to-one overall advantage in aircraft that grows to almost a six-to-one

⁷² "Russia's Irkut About to Complete Su-30MKI Deliveries to India, Start Production at HAL Enterprises," English compilation of reports from the website of Moscow Voyennykh Novostey, 11 May 2004. Accessed from FBIS on January 2005 at <https://portal.rccb.osis.gov/>.

⁷³ Ibid.

⁷⁴ R. Sukumaran, "The 1962 India-China War and Kargil 1999: Restrictions on the Use of Air Power," Strategic Analysis: A Monthly Journal of the IDSA, Vol. XXVII, No. 3, July to September 2003.

⁷⁵ *Doctrine of the Air Force*, Air Headquarters, New Delhi, October 1995, referenced in V.R. Raghavan's, "Limited War and Nuclear Escalation in South Asia," from *The Nonproliferation Review*, Vol.8, No. 3 (Fall-Winter 2001): 8.

advantage when one compares just the modern and most capable aircraft.⁷⁶ The addition of the Su-30MKI tilts the conventional arms advantage even more in India's favor. Furthermore, the Su-30MKI, with its advanced avionics, precision-guided munitions, and data links capable of uploading valuable targeting data, fits well into India's new military strategy of limited war. This limited war strategy calls for the IAF to conduct precise, punitive strikes on enemy targets within Pakistan with little collateral damage (a likely scenario if the Pakistani military were to support insurgents operating in Kashmir). The overall strategy of the Indian military is to hit Pakistan quickly and aggressively. The Su-30MKI helps support this objective by potentially limiting the length of the conflict in order to avoid unnecessary international pressure to act otherwise.

⁷⁶ Rodney W. Jones, "Force Modernization Trends-India and Pakistan," 23-25 October and Military Asymmetry and Instability in Emerging Nuclear States: India and Pakistan, March 2002 from Peter R. Lavoy and Major Stephen A. Smith's "The Risk of Inadvertent Nuclear Use Between India and Pakistan," (03 February 2003), *Strategic Insight*, Center for Contemporary Conflict, at <http://www.ccc.nps.navy.mil/>. Last accessed January 2005.

COMPARISON TABLE			
	Su-30MKI	Su-30MK (J-11)	F-15E
Origin	Russia & India	Russia & China	USA
Type	Multirole fighter	Multirole Fighter	Multirole Fighter
Layout	Triplane with canards	Biplane	Biplane
Crew	Two in tandem	Two in Tandem	Two in Tandem
Weight (Empty)	17000 kg approx	17000 kg approx	14,300 kg
Weight (Max)	34,500 kg	35,000 kg	36,700 kg
Max payload	?	?	10,650 kg
Max speed (at altitude)	Mach 2.3	Mach 2.3	Mach 2.5
Max speed (at sea level)	Mach 1.1	Mach 1.1	Mach 1+
Range	3865 km	3865 km	4445 km with ext. fuel
Avionics: Radar	Phazotron 011M (PA)	Zhuk 010	Texas Instruments
Rearward facing radar?	Yes, Zhuk/Ryazan	No	No
Terrain following?	Yes	No	Yes
Jammers	Israeli Elta (?)	Su-27 ECM package	ALQ-135
Datalink	Yes	Yes	Yes
Aerial Refueling	Yes	No	Yes
Infra Red searching device	IRST in nose	IRST in nose	AAQ-13 & AAQ-14 FLIR
Glass cockpit	Yes	No	Yes
Gun	Gsh-301 30 mm	Gsh-301 30 mm	M161A1 20 mm
Air to Air Armament	R-77 Active Radar Missile R-27 SARH Missile (All) R-60 & R-77 IRH Missiles Possibly DERBY, MICA, PYTHON IV and MAGIC II	R-77 Active Radar Missile R-27 SARH Missile (All) R-60 & R-77 IRH Missiles	AIM-120A/B AMRAAM AIM-7E SPARROW AIM-9 SIDEWINDER
Air To Ground Armament	Freefall bombs, ARMs, TVGBs, LGBs, clusters, and in the future PJ-10 BRAHMOS	Freefall bombs, LGBs, TVGBs and clusters	Mk.82 & Mk.84 bombs GBU-10/12/24 LGBs GBU-15 & AGM-130 AGM-65 MAVERICK AGM-88 HARM B51 & B61 nuclear bombs
Thrust Vectoring?	3D	No	No

Table 1. Performance/capability comparison of IAF Su-30 MKI to the Russian/Chinese Su-30MK (J-11) and American F-15E⁷⁷

While the acquisition and development of the Su-30MKI adequately meets the IAF's objectives in a limited war scenario with Pakistan, it is more difficult to ascertain the IAF's conventional goals in comparison with China. Obviously, the Su-30MKI increases the ability of the IAF to defeat the PLAAF's combat aircraft and gain air superiority in any border conflict with China. Unfortunately, the PLAAF, with over 3,000 combat aircraft has an enormous quantitative advantage over India in a conventional sense.⁷⁸ Conversely, China has been extremely slow in modernizing its air force due to

⁷⁷ Ahmedullah, "India Enters Fighter "Big League."

⁷⁸ A.K. Sachdev, "Modernization of the Chinese Air Force," *Strategic Analysis: A Monthly Journal of the IDSA*, Vol. 23, No. 6, September 1999.

inadequacies in its military industrial complex and its failure to acquire to obtain high-technology from Western powers due to sanctions imposed by the Europeans and Americans after the Tiananmen Square incident.⁷⁹ With the Su-30MKI, the IAF has made a modest effort to catch up with the PLAAF in terms of quality. In any case, The PLAAF realizes that the IAF is significantly modernizing its combat aircraft capability and is acquiring highly capable Su-27 and Su-30MKs (not to defeat India in an air war, but primarily to gain air superiority against Taiwan, if it decides to declare independence). The modernization efforts of both air forces represent not only the desire to defend their respective territories, but to project force as an emerging regional power. Depending on how long it will take the PLAAF to modernize (estimates range from 10 to 20 more years), the IAF's fleet of combat aircraft (led by the Su-30MKI) is presently capable of defending Indian territory from a Chinese air attack.

2. Nuclear Role for Su-30MKI

In January 2003, India finally announced its nuclear doctrine and the establishment of a Strategic Forces Command aimed at removing any existing ambivalence surrounding India's nuclear policy.⁸⁰ With the formation of this Strategic Forces Command, India finally began to institutionalize its nuclear policy of no-first-use and minimum credible nuclear deterrence.⁸¹ While no mention was made of conventional capability or nuclear triad, it is assessed that India's primary means of nuclear delivery will be from the air until the maturity of its ballistic missile capability.⁸²

Since Pakistan's military is ultimately responsible for its nuclear program, it has weaponized and deployed its nuclear arsenal more efficiently than India's civilian nuclear program, which is just beginning to work with India's armed forces (reference Table 2 below, Comparison of Indian and Pakistani Nuclear Programs). For instance, the primary

⁷⁹ Despite the concerns of President Bush, the European Union is almost certain to lift the 15-year-old arms embargo on China by June 2005. The Bush administration fears that such technology would allow China to modernize its military and upset the balance of power in Asia. If China were able to have access to Europe's defense industry, it may be able to quicken its modernization efforts and upgrade its air force. From Elisabeth Bumiller's article, "Bush Voices Concern on Plan to Lift China Arms Embargo," *New York Times*, 22 February 2005, www.nytimes.com. Last accessed February 2005.

⁸⁰ "India Armed Forces," *Jane's Sentinel Security Assessment*, South Asia, posted 16 April 2004, www.janes.com. Last accessed June 2004.

⁸¹ 2003-2004 Annual Report, Ministry of Defence, Government of India, 14.

⁸² Ashley Tellis, *India's Emerging Nuclear Posture* (Santa Monica: RAND, 2001), 531.

delivery means of nuclear weapons for Pakistan is via its advanced ballistic missile program, while India's primary platform of nuclear delivery remains its fighter-bomber aircraft.⁸³ Currently, the IAF Mirage-2000H, Su-30MKI, Jaguar S(I), and Mig-27 are the platforms capable of delivering nuclear weapons.⁸⁴ The IAF is more likely to use these aircraft as nuclear delivery platforms in the near future because they are already integrated into the force structure of the IAF and are considered reliable in terms of safety.

⁸³ "India and Pakistan's Nuclear Capabilities," derived from the *Deadly Arsenals-Tracking Weapons of Mass Destruction* book by Joseph Cirincione, Jon B. Wolfshtal, and Miriam Rajkumar, Carnegie Endowment for International Peace, 01 June 2002, <http://www.ceip.org/>. Last accessed June 2004.

⁸⁴ Peter R. Lavoy and MAJ Stephen A. Smith, "The Risk of Inadvertent Nuclear Use Between India and Pakistan," *Strategic Insights*, Volume II, Issue 2, February 2003, <http://www.ccc.nps.navy.mil/si/feb03/southAsia2.asp>. Last accessed June 2004.

<i>Aircraft/Missile</i>	<i>Range</i>	<i>Source</i>	<i>Status</i>
Mirage-2000H	1,205 km	France	2 squadrons, 35 planes in inventory
Su-30 MKI	3,000 km	Russia	50 planes purchased, 18 in inventory
Jaguar S(I)	850 km	UK/France	4 squadrons, 88 planes in inventory
MI-27 ML	500 km	Russia	214 planes in inventory
Prithvi 1 (SS-150)	150 km	indigenous	Amy version, in service
Prithvi 2 (SS-25)	250 km	indigenous	Air Force version, tested, in development
Prithvi 3 (Dhanush)	350 km	indigenous	Navy version, failed test in 2000, in development
Agni 1	700-900 km	indigenous	tested in January 2000, in development
Agni 2	2,000-3,000 km	indigenous	tested in 1999 and 2001, in development
Agni 3	3,500-4,000 km	indigenous	in early development

<i>Aircraft / Missile</i>	<i>Range</i>	<i>Source</i>	<i>Status</i>
F-16 A/B	925 km	United States	32 planes in inventory
Mirage 5 PA	1,300 km	France	50 planes in inventory
Hatf 1	80 D 100 km	indigenous	in service since mid-1990s
Hatf 2 (Abdali)	180 km	Indigenous/China	tested May 2002, in production
Hatf 3 (Ghaznavi)	290km	Indigenous/China	M-11, tested May 2002, in service
Hatf 4 (Shaheen 1)	600-700 km	indigenous/China	tested October 2002, in service
Hatf 5 (Ghauri 1)	1,300-1,500 km	indigenous/DPRK	No Dong, tested in May 2002, in service
Hatf 5 (Ghauri 2)	2,000 km	indigenous/DPRK	No Dong, tested in April 2002, in development
Hatf 6 (Shaheen 2)	2,000 - 2,500 km	indigenous/China	not yet tested, in development

Table 2. Comparison of India (Top) and Pakistan's (Bottom) Nuclear Delivery Systems⁸⁵

⁸⁵ Lavoy and Smith.

While the Su-30MKI has the longest range of fighter in the IAF inventory with a combat radius of 1500km these aircraft are still new to the IAF as the first two squadrons were inducted in 2002.⁸⁶ Due to its advanced avionics and extensive combat radius, the IAF foresees the Su-30MKI as the most likely candidate to assume the nuclear role over the long-term. The Su-30MKI provides India with the long-range capability to deliver nuclear weapons at any strategic target anywhere within Pakistan (reference graph below). With the Su-30MKI, India now possesses another platform capable of conducting a strategic nuclear strike deep inside Pakistani territory, strengthening its nuclear deterrence vis-à-vis Pakistan.

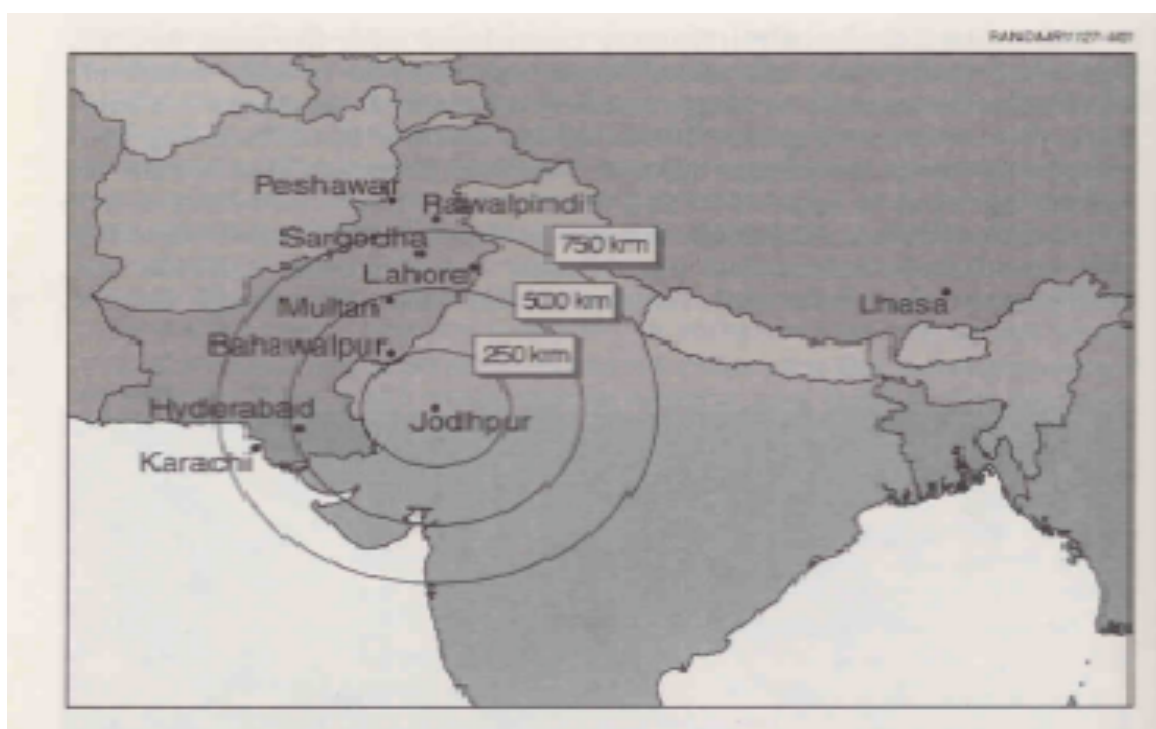


Figure 4. India's Strategic Nuclear Reach from Jodhpur⁸⁷

⁸⁶ The combat radius of the Mirage-2000H is 750km, the Jaguar S(I) is 1000km, and the Mig-29 is 650km. Data from *The Indian Defense Yearbook 2004*, edited by Lt. General (retired) RK Jasbir Singh (India: Natraj Publishers, 2004), 338 and 500-501.

⁸⁷ Tellis, *India's Emerging Nuclear Posture*, 537. Note that the Su-30MKI based out of Jodhpur (with a combat radius of 1500km) could easily reach any target within Pakistan in a permissive environment (one in which India has air superiority over Pakistan).

India's nuclear tests in May of 1998 were conducted to assure its citizens that nuclear weapons would protect and promote national security.⁸⁸ In addition, the party in power at the time, the Bharatiya Janata Party (BJP), argued that India conducted the nuclear tests since China represented a long-term threat to Indian security.⁸⁹ Since India perceives China as its long-term security threat, the employment of the Su-30MKI in a nuclear role demonstrates India's strategic intent to deter and match China.⁹⁰ In reality, it is highly unlikely that India could successfully deliver a nuclear weapon on any significant target in China since these aircraft would have to cover such a large distance at low levels in order to avoid China's sophisticated Integrated Air Defense System (IADS).⁹¹ India cannot successfully defeat the PLA's strategically superior Second Artillery (China's conventional ballistic missile and nuclear strategic rocket forces) so its acquisition of the Su-30MKI at least demonstrates to China its resolve in acquiring the most sophisticated fighter available to deliver nuclear weapons. In reality though, the IAF will utilize the Su-30MKI to fulfill its need for an advanced multi-role fighter in a conventional border conflict, not to execute a nuclear attack on China. If the Su-30MKIs were forward deployed along the border with China to execute a nuclear mission they would only get 1500km into China, well short of the 2500km needed to reach high value targets in Beijing (reference graph below). Thus, it will be extremely difficult for the Su-30MKI to deliver a nuclear weapon inside China because of the lack of strategic targets within the aircraft's combat radius, the strength of the Chinese IADS, and the caution of the IAF leadership to commit a high valued asset on an extremely risky mission.⁹²

⁸⁸ "India Armed Forces," *Jane's Sentinel Security Assessment*, South Asia.

⁸⁹ Ibid.

⁹⁰ From text of 13 May 1998 letter from Indian Prime Minister Vajpayee to U.S. President Clinton, posted on the Embassy of India, Washington D.C. website located at <http://www.indianembassy.org/indusrel/pmlletter.htm>. Last accessed March 2005.

⁹¹ Tellis, *India's Emerging Nuclear Posture*, 552.

⁹² Tellis takes a different viewpoint by arguing that the Mirage 2000-H would be the best platform for a nuclear delivery mission because of the aircraft's combat radius, avionics, defensive weaponry, and countermeasure systems. Ibid, 543.

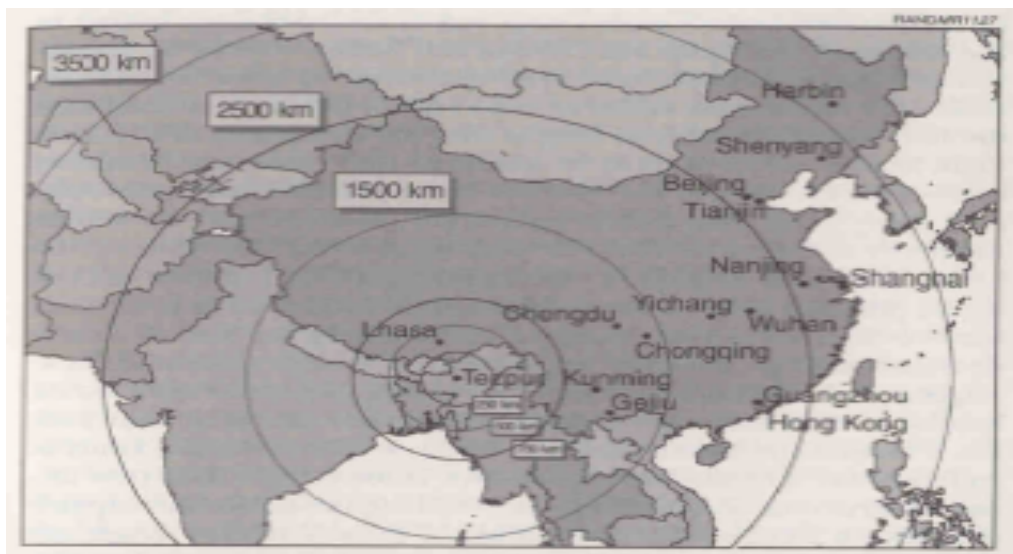


Figure 5. India's Strategic Nuclear Reach from Tezpur⁹³

D. IAF PHALCON AIRBORNE EARLY WARNING SYSTEM: EXPANDING INDIA'S ISR CAPABILITIES

On 29 February 2004, the Israeli government approved a U.S. \$1.1 billion deal to export three of its Phalcon airborne early warning system to India.⁹⁴ The agreement represents the largest single deal in the history of Israel's export program and further signified the strengthening of Indo-Israeli defense ties.⁹⁵ The Phalcon airborne early warning system essentially gives India the ability to detect aerial threats and serve as a platform to direct Indian combat jets on targets.⁹⁶ Currently, the Israeli Phalcon radar is being integrated on the Russian IL-76 transport jets under Indian supervision while the software programs are being written by Indian software engineers.⁹⁷ The operational altitude of the Phalcon airborne early warning system will be roughly 30,000 feet, with the

⁹³ *India's Emerging Nuclear Posture*, 553. Note that Su-30MKIs based out of Tezpur would be unable to hit targets in Beijing if they were unrefueled. Basically, the combat radius of the Su-30MKI (1500km) falls far short of the 2500km necessary to target Beijing.

⁹⁴ "Israel Will Sell Radar to India," *STRATFOR*, 01 March 2004, <http://www.stratfor.biz>. Last accessed June 2004.

⁹⁵ Ibid.

⁹⁶ "India, Israel, Russia Sign Phalcon Radar Deal," *HindustanTimes* Online, New Delhi, 10 October 2003, <http://www.hindustantimes.com>. Last accessed June 2004.

⁹⁷ "Article Examines Purchase of Israeli Radar Against India's Air Defense Network," Institute of Peace and Conflict Studies, 23 March 2004, FBIS.

capability to monitor low-level activity in the air space for ranges of 500 km.⁹⁸ The Phalcon will be able to track 100 targets, pass real time data to Indian combat fighters, and even perform limited ELINT (Electronic Intelligence) and COMINT (Communications Intelligence) operations up to 1000 km, automatically data linking this intelligence to ground stations.⁹⁹ The Phalcon airborne early warning system is a force multiplier that will maximize India's air defense capability while also maintaining the option to direct IAF combat aircraft on enemy targets. After the addition of more powerful engines and up-to-dated avionics in Russia, followed by the addition of the Phalcon radar suite in Israel, the first complete system is expected to be in service by the end of 2006, with the finalization by 2009/2010.¹⁰⁰

1. Conventional Role for the Phalcon Airborne Early Warning System

In a conventional role, the proper employment of the Phalcon AWACS (Airborne Early Warning and Control System) should meet the IAF's primary goal of Indian air defense.¹⁰¹ With the Phalcon AWACS, the IAF will be able to track any Pakistani aircraft that enters Indian airspace and guide IAF fighters to their location accordingly. Psychologically, this is a great conventional advantage for India over Pakistan since it neutralizes Pakistan's capability (already limited with aging combat fighters) to deliver munitions on Indian targets from the air. For example, Pakistan's current Foreign Minister Khurshid Mahmud Kasuri argued that the Indian acquisition of the Phalcon AWACS, "Will destabilize the whole region, not just South Asia but the Middle East. It is very, very dangerous."¹⁰² While Pakistan struggles to come to terms with the IAF's acquirement of the Phalcon AWACS, it is also extremely susceptible to India being able to look well into Pakistan. The Phalcon AWACS further supports the Indian military's objective of conducting a limited war campaign versus Pakistan since it provides fighter aircraft with real time targeting data on Pakistani targets, including Pakistan's air bases, military garrisons, or possible shelters for Kashmiri insurgents.

⁹⁸ "Article Examines Purchase of Israeli Radar Against India's Air Defense Network."

⁹⁹ Ibid. The Phalcon airborne early warning suite (radar dome) will be fitted onto the Il-76.

¹⁰⁰ "India Armed Forces," *Jane's Sentinel Security Assessment*, South Asia.

¹⁰¹ Agmon and Tanham. *The Indian Air Force: Trends and Prospects*, 45.

¹⁰² "Pakistan Vows to Match India over Israeli Radar Deal: World Community's Help Sought," *Dawn Online*, 11 November 2003, <http://www.dawn.com>. Last accessed June 2004.

India's acquisition of the Phalcon AWACS gives it a tactical advantage versus China. For instance, since the Phalcon system can pick out enemy aircraft flying hundreds of miles away in all weather, day or night, or even those flying at low altitude, it could counter any conventional PLAAF threat in the North or Northeast of India well in advance.¹⁰³ This advanced warning is vital in any conventional confrontation with China since India is still modernizing its air defense and interceptor aircraft (already moving in the right direction with the Su-30MKI) that will take some time to develop. The Phalcon AWACS closes the qualitative conventional gap with China, giving India the early warning it needs to properly defend itself from any "nasty surprises" along the Himalayas to avert any future wars with timely and diplomatic action.¹⁰⁴ Although it will take some time to integrate the Su-30MKI with the Phalcon AWACS, India must accomplish this task if it hopes to move towards network centric warfare and keep China somewhat off balance. With India and China's history of conventional conflict, and mutual suspicions, it will be relatively easy for both countries to misconstrue each other's motives.¹⁰⁵ Therefore, aside from the primary reason of obtaining early warning indications of incoming Pakistani aircraft, the IAF also acquired the Phalcon AWACS to substantially upgrade its early warning capability to meet any contingency with the PLAAF in the Himalayas.¹⁰⁶

2. Nuclear Role for the Phalcon Airborne Early Warning System

The Phalcon AWACS further tilts the conventional balance in India's favor vis a vis Pakistan, but its utility as a nuclear deterrent role are less advantageous. For example, if the nuclear threshold for Pakistan lowers (highly likely due to India's massive conventional advantage), Pakistan may "go nuclear," launching nuclear ballistic missiles into India as its primary delivery system. While an airborne Phalcon AWACS could identify and vector IAF aircraft to destroy an incoming Pakistani Air Force (PAF) jet (either a F-16 A/B or the Mirage 5 PA) equipped with nuclear missiles, it is unlikely that

¹⁰³ Biman Mukherji, "India and Israel Sign One Billion Dollar Defense Deal," *Agence France Presse*, 05 March 2004, <http://www.nexis.com>. Last accessed July 2004.

¹⁰⁴ Air Commodore Ramesh V. Phadke in his working paper for International Security and Cooperation (CISAC), Stanford University, entitled, "People's Liberation Army Air Force (PLAAF): Shifting Airpower Balance and Challenges to India's Security," February 2002, 20.

¹⁰⁵ Ibid.

¹⁰⁶ Ibid.

Pakistan would deliver nuclear weapons from the air but use its highly mobile ground-based nuclear ballistic missiles instead. A better utilization of the Phalcon AWACS in a nuclear role is to “look inside” Pakistan in an effort to identify Pakistan’s mobile ballistic missile systems and/or command and control centers. The Phalcon AWACS could provide precise targeting data for nuclear equipped IAF aircraft, directing them through “holes” in Pakistan’s air patrols and onwards to the enemy’s strategic targets such as Pakistani nuclear storage facilities, command and control centers, or military leadership targets. Since India cannot compete with Pakistan’s nuclear ballistic missile capability, the acquisition of the Phalcon AWACS does not provide it with any significant advantage versus Pakistan in a nuclear scenario.

With the close political and military ties between China and Pakistan, China was dismayed with India’s purchase of the Phalcon AWACS. To make matters worse, China was denied the very same package from the United States in 2002.¹⁰⁷ In order to gain an airborne early warning capability, China purchased the A501 airborne early warning aircraft from Russia; it is assessed through open sources that two A501 airborne early warning aircraft are operational and are operating in the Nanjing Military Region of China, opposite Taiwan (see photo below).¹⁰⁸

¹⁰⁷ Mukherji, “India and Israel Sign One Billion Dollar Defense Deal”

¹⁰⁸ “HK Daily: PLA’s Early Warning Aircraft Possess ‘Serious Threat’ to Taiwan,” *Hong Kong Tai Yang Pao* (Internet Version) in Chinese, 05 April 2004, FBIS.



Figure 6. PLAAF A501 Airborne Early Warning Aircraft Observed Over Nanjing, China¹⁰⁹

China already possesses a strategic nuclear advantage over India (reference Table 3 below, Chinese Nuclear Forces, as of January 2003), yet it is employing its airborne early warning in a conventional role in relation to Taiwan. Since it will take at least another two years for the IAF to employ the Phalcon AWACS in any conventional operations, it is assessed that they will not be utilized in any nuclear role versus China (vectoring of IAF combat aircraft with nuclear weapons onto Chinese strategic targets) in the foreseeable future. The Phalcon AWACS does not provide India with the ability to deter or match China in the realm of nuclear force capabilities since China already possesses a variety of its own force multipliers in any nuclear confrontation.

¹⁰⁹ “HK Daily: PLA’s Early Warning Aircraft Possess ‘Serious Threat’ to Taiwan,” *Hong Kong Tai Yang Pao*.

	NATO designation	Number deployed	Year first deployed	Range	Warheads	Numbers
Aircraft						
H-6	B-6	120	1965	3100	1-3 bombs	120
Q-5	A-5	30	1970	400	1 bomb	30
Land-based missiles						
DF-3A	CSS-2	40	1971	2800	1 x 3.3 Mt	40
DF-4	CSS-3	12	1980	5500	1 x 3.3 Mt	12
DF-5A	CSS-4	20	1981	13000	1 x 4-5Mt	20
DF-21A	CSS-5	48	1985-86	1800	1 x 200-300kt	48
SLBMs						
Julang I	CSS-N-3	12	1986	1700	1 x 200-300kt	12

Table 3. Chinese Nuclear Forces, as of January 2003 (Range in Kilometers) ¹¹⁰

E. IAF IL-78 AIR-TO-AIR REFUELER

The Indian Defense Ministry ordered six Il-78 mid-air refueling planes from Uzbekistan in October of 2001 for the price of US \$150 million.¹¹¹ The IAF's induction of the Ilyushin-78 "Midas" tankers will increase the range and endurance of its mid-air refueling capable Su-30MKIs, Mig-29s, and Jaguars fighter aircraft.¹¹² Specifically, the mid-air refueler Il-78 will enhance the strike range of the IAF's Su-30MKIs to more than 5,000 km.¹¹³ The Il-78 has the basic Il-76 platform so the new squadron of Il-78s will be based at Agra (see Figure 7. IAF Locations Throughout India below) because all of the

¹¹⁰ Hans M Kirstensen and Shannon N Kile, "Nuclear Arms Control, Non-Proliferation and Ballistic Missile Defense", SIPRI Yearbook 2003, p.620, from Major General Dipankar Banerjee's (Retd) Draft Paper, "India-Pakistan-China-A Nuclear Arms Race in Asia?" Major General Dipankar Banerjee is the Director, Institute of Peace and Conflict Studies, an independent and autonomous research institution, New Delhi, India, <http://www.eias.org/conferences/>. Last accessed July 2004.

¹¹¹ "Uzbekistan's Aviation Industry Booms," BBC Online, 18 December 2001, <http://news.bbc.co.uk>. Last accessed July 2004.

¹¹² Sayan Mazumdar, "Phalcon AWACS and In Flight Refueling," *India Defense Consultants*, 24 December 2002, <http://www.indiadefence.com>.

¹¹³ "Newly Raised Squadron of 'Air Refueler' Il-78 Will be Based at Agra," *New Delhi The Asian Age*, in English, 16 Feb 2003, FBIS.

infrastructure, equipment, and support personnel for the Il-76 are available there.¹¹⁴ With this capability, the IAF is only the sixth air force in the world to possess such a force multiplier; aircrew and maintenance personnel have been undergoing training in Uzbekistan since the beginning of 2003.¹¹⁵ The Il-78 will enhance the IAF's strategic depth in the IAF's primary role of air defense, while also increasing the IAF's offensive conventional and unconventional capability to strike targets deep into Pakistan or China.



Figure 7. IAF Locations Throughout India¹¹⁶

¹¹⁴ "Newly Raised Squadron of 'Air Refueler' Il-78 Will be Based at Agra," *New Delhi The Asian Age*.

¹¹⁵ "IAF Inducts Il-78 Midair Refuelers," *Rediff.com*, 04 March 2003, www.rediff.com. Last accessed July 2004.

¹¹⁶ "India Armed Forces," *Jane's Sentinel Security Assessment*, South Asia. The majority of the Su-30MKIs will be stationed in Pune, the Il-78s in Agra, and the Phalcon AWACS probably in Agra as well.

1. Conventional Role for Il-78 Air- to- Air Refueler

While the political dialogue between India and Pakistan has resumed, the IAF continues to patrol its western border, searching for any enemy infiltrations.¹¹⁷ Now with the capability to conduct mid-air refueling, the IAF has yet another conventional advantage over the PAF. With the Il-78 air-to-air refueler (see Figure 8. IAF Il-78 Mid-air Refueling of Two IAF Su-30MKIs below), the loitering time of specifically configured IAF aircraft (Su-30MKIs come equipped with mid-air refueling probes, while probes for the Mirages and Jaguars have already been procured) will be dramatically increased, enhancing India's air defense capabilities.¹¹⁸ Instead of landing to refuel, IAF combat aircraft will now be able refuel in flight and quickly attack targets in Pakistan-controlled Kashmir, or Pakistan itself.



Figure 8. IAF Il-78 Mid-air Refueling of Two IAF Su-30MKIs.¹¹⁹

¹¹⁷ "India's Western Border Still a Hot Spot: Air Force Chief," *Pakistan Press International Services Limited*, 20 November 2003, <http://www.nexis.com/>. Last accessed July 2004.

¹¹⁸ "India's Western Border Still a Hot Spot: Air Force Chief."

¹¹⁹ Photo retrieved from the Indian Air Force, Bharatiya Vayu Sena website, <http://www.bharat-rakshak.com/IAF/>. Last accessed July 2004.

Combined with the IAF's quantitative advantage over Pakistan, this mid-air refueling capability further enhances the IAF's conventional superiority over its western neighbor. Furthermore, India's new "Cold Start" military doctrine supports the application of eight integrated battle groups led by the Indian Army with elements of the IAF and Navy as thrust formations, calling for hard strikes into enemy territory, yet limiting them to the point that they should not invite any nuclear retaliation.¹²⁰ With the Il-78 air-to-air refueler, the IAF will be better prepared to support the "Cold Start" doctrine by quickly mobilizing combat aircraft to desired forward locations, providing these combat aircraft with the necessary "legs" to loiter and strike targets requested by the Indian Army. The Il-78 provides the IAF with the unique capability to project force to India's periphery, enhancing the IAF to deter and defeat the PAF.

The Il-78 air-to-air refueler also increases the IAF's combat capability versus PLAAF. According to an anonymous IAF officer, "With such air-to-air refuelers, we will be able to fly our air superiority fighters like the Su-30MKIs for over 10 hours at a stretch without landing. Similarly, longer air defense missions would also be possible. It will enhance our capabilities against China."¹²¹ China is still in the process of diversifying its air force (in the past, 70 percent of the PLAAF consisted of combat fighters); therefore, the PLAAF is pursuing its own mid-air refueler to project power along its borders.¹²² At the present, one regiment of about 10 H-6U tankers, converted from H-6 bombers, support a regiment of J-8D fighters, while China is looking to procure Il-78M tankers from Russia in the future.¹²³ For the time being, the IAF maintains a competitive advantage over the PLAAF's mid-air capabilities in terms of quality since the IAF Il-78s have already begun to conduct air-to-air refueling with the IAF's advanced Su-30MKI. The PLAAF remains

¹²⁰ Shishir Gupta, "India's Military Commanders Finalize 'New' War Doctrine," *The Indian Express*, 06 March 2004, FBIS, SAP20040306000005.

¹²¹ "India Seeks Uzbek-Made Aircraft to Enhance Capability Against China," *BBC Monitoring International Reports*, 03 September 2002.

¹²² John Wilson Lewis and Xue Litai, "China's Search for a Modern Air Force," *International Security*, Vol.24, No.1 (Summer 1999), 82.

¹²³ "China's Air Force," *Jane's Sentinel Security Assessment – China and Northeast Asia*, 27 May 2004, www.janes.com. Last accessed July 2004.

behind the IAF in this realm as India continues to close the conventional gap with China by concentrating on equipment which gives it a qualitative advantage to match China's large military.

2. Nuclear Role for Il-78 Air- to- Air Refueler

The acquisition of the Il-78 air-to-air refueler does not improve India's nuclear capability versus Pakistan. Air-to-air refuelers are unnecessary in a nuclear role because the IAF's nuclear capable aircraft already cover most of the territory inside Pakistan unrefueled. The only possible role of the air-to-air refuelers in a nuclear scenario would be to keep more combat aircraft airborne and defend against Pakistani aircraft equipped with nuclear weapons that may attempt to enter Indian airspace and destroy a strategic target with India. However, this scenario is far-fetched since Pakistan would likely resort to its sophisticated and highly mobile nuclear ballistic missile force to attack strategic targets within India. Realistically, the attainment of the Il-78 tanker is more likely to be used in a conventional role against Pakistan than a nuclear role. India's acquirement of these air-to-air refuelers reflects the transition of the IAF from an air defense role to one of force projection.

Due to the sophistication of China's nuclear triad, it would be unwise for India to attempt to refuel an IAF combat fighter (equipped with a nuclear weapon) to strike strategic targets deep into China. While India could argue that it now has the capability to deliver such a blow to China, it will still be extremely difficult for this to succeed due to China's advanced sophisticated air defense systems (such as the Russian supplied SA-20 surface to air missile systems).¹²⁴ If anything, the IAF's employment of the Il-78 will remain in the conventional arena as India continues to exert its prestige and influence along its borders. The Il-78 air-to-air refueler does not provide India with any nuclear advantage in relation to China and will be utilized in a conventional role to apply pressure on Pakistan while maintaining the highest degree of strategic air defense throughout South Asia.

¹²⁴ Alan Vick, Richard M. Moore, Bruce R. Pirnie, John Stillion, *Aerospace Operations Against Elusive Ground Targets* (Santa Monica: RAND, 2001), 62. The SA-20 is an advanced version of the SA-10. It has a range of 200km plus an extremely effective guidance and control capable of intercepting aircraft flying between 10 and 30,000 m.

F. U.S. SECURITY INTERESTS IN SOUTH ASIA

With a decade of economic growth, relatively stable democracy, and a new foreign policy orientation that is a fresh change from its decades-old “non-alignment” policy, India has the potential to develop a long-term political and security partnership with the United States.¹²⁵ Despite an erratic history, both countries have come to realize many benefits of working together, especially in the fields of economics and security. India ultimately desires the high technology possessed by the United States, and is willing to support the United States on various security issues to obtain it; for instance, the Indian Navy has offered to patrol the Straits of Malacca against terrorist attacks.¹²⁶ While Congress Party, which came to power in 2004, may backtrack on some of the progress made on defense issues by the previous Indian government led by the BJP, talks in the Defense Policy Group (the highest forum for U.S.-Indian military engagement) are moving forward. For instance, in recent talks between Douglas Feith, U.S. Undersecretary for Defense Policy, and various high-ranking Indian officials, both sides agreed to strengthen their cooperation in defense and the global war on terrorism (to include proliferation of weapons of mass destruction and security of sea lanes).¹²⁷ Since America’s main concern today is the global war on terrorism, it would like to see both India and Pakistan reach some type of agreement on Kashmir, curbing acts of terrorism in the region. The United States will have to be extremely careful in this endeavor since it cannot be seen as the force behind any resolution on Kashmir. Progress on Kashmir has improved gradually, with both Pakistan and India moving forward on high-level diplomatic talks. For example, through the hard work of their respective foreign ministers, the Prime Minister of India, Manmohan Singh and the President of Pakistan, Pervez Musharraf met each other as the respective leaders of their country for the first time in New York (September 2004) for the General Assembly of the United Nations. While the United States will have to try to distance itself from any Indian and Pakistan

¹²⁵ *New Priorities in South Asia: U.S. Policy Toward India, Pakistan, and Afghanistan*, Chairmen’s Report of an Independent Task Force Cosponsored by the Council on Foreign Relations and the Asia Society (New York: Council Foreign Relations, Inc, 2003), 1.

¹²⁶ Sudha Ramachandran, “India Signs on as Southeast Asia Watchdog,” *Asia Times Online*, 05 April 2002, <http://www.atimes.com/ind-pak/DD05Df01.html>. Last accessed July 2004.

¹²⁷ “India, US Increase Defense, Antiterror Links,” *Washington Times*, 05 June 2004, www.washingtontimes.com. Last accessed July 2004.

resolution on Kashmir, the United States has strengthened its military to military relationship with India over the last couple of years.

As a growing economic power, India has made a concentrated effort to update its military forces in order to secure its goals (deter and defeat Pakistan/deter and match China). The modernization of the IAF analyzed above details the amount of resources dedicated to making India one of the most influential and powerful air forces in all of Asia. While the IAF is acquiring the necessary equipment, it has also conducted a number of exercises with the U.S. Air Force (USAF) in an effort to learn from the USAF and improve the actual application of these modern weapon systems. The purpose of these joint exercises are two-fold, India can practice flying with what is considered the most powerful air force in the world, and the United States can strengthen bilateral ties with an emerging air force in South Asia that may help the United States counter the growing strength of China in Asia.

The latest joint exercise, dubbed “Cope India,” concluded on 25 February 2004 and took place in Gwalior Air Force Station in central India; it was the biggest joint exercise ever between the IAF and the USAF.¹²⁸ The USAF flew in six F-15C aircraft for the exercise, while the IAF joined in with Su-30Ks (Flanker), Mirage 2000s, MiG-29s (Fulcrum), MiG-27s (Flogger), and MiG-21s (Bison); the exercise included a series of offensive counter-air and defensive counter-air engagements.¹²⁹ While the IAF did not fly the advanced Su-30MKI, the IAF were able to garner a significant amount of information from USAF tactics, techniques, and procedures. Undoubtedly, this training should help in the development of the Su-30MKI's air defense and offensive counter-air capabilities. Alternatively, the USAF had its first opportunity to train against the Su-30K that will enhance the F-15's capability against an aircraft currently in the PLAAF inventory (if future conflicts between the USAF and PLAAF should ever present themselves). While the United States has not supplied India with nearly as much security assistance as it has to Pakistan (reference Table 4 below, US Assistance to India, FY 2001-2004, and Brief

¹²⁸ “F-15s Head Home From Indian Joint Exercise,” *Air Force Times*, 08 March 2004.

¹²⁹ Maj. James Law, “Cope India Brings Out Fighter Ops,” *Pacific Air Forces Public Affairs*, <http://www.bharat-rakshak.com>. Last accessed July 2004.

History of US-Indian Security Ties), exercises like this will significantly improve the IAF's operational capabilities in any air defense or counter-air roles versus both Pakistan and China.

Program or Account	FY2001 Actual	FY2002 Actual	FY2003 Allocation	FY2004 Request
CSH	24.6	41.7	40.8	40.8
DA	28.8	29.2	34.4	27.1
ESF	5.0	7.0	10.5	20.0
FMF	-.-	-.-	5.0	5.0
IMET	0.5	1.0	1.0	1.3
NADR-EXBS	0.9	0.9	1.0	1.0
Subtotal	\$59.8	\$79.8	\$92.7	\$95.2
P.L.480 Title II*	78.3	93.7	91.3	45.0
Section 416(b)*	-.-	12.0	-.-	-.-
Total	\$138.1	\$185.5	\$184.0	\$140.2

Sources: U.S. Departments of State and Agriculture; U.S. Agency for International Development.

Abbreviations:

CSH: Child Survival and Health

DA: Development Assistance

ESF: Economic Support Fund

FMF: Foreign Military Financing

IMET: International Military Education and Training

NADR-EXBS: Nonproliferation, Anti-Terrorism, Demining, and Related - Export Control and Related Border Security Assistance

P.L.480 Title II: Emergency and Private Assistance food aid (grants)

Section 416(b): The Agricultural Act of 1949, as amended (surplus agricultural commodity donations)

*Food aid amounts do not include what can be significant transportation costs.

Table 4. US Assistance to India, FY 2001-2004 (in millions of US Dollars) and Brief History of US-Indian Security Ties¹³⁰

Another exercise with the U.S. and NATO forces, named Cope Thunder, took place in June of 2004. The IAF participated in a joint exercise with the USAF and other air forces, to include Britain, France, Germany, Japan, and Canada on 7 July 2004 in Alaska.¹³¹ Six IAF Jaguar deep-penetration strike aircraft crossed the Atlantic Ocean

¹³⁰ Kronstadt, CRS-4.

¹³¹ "F-15s Head Home From Indian Joint Exercise," *Air Force Times*.

supported by its two operational Il-78 mid-air refueling tankers in order to participate in this multi-national exercises; this was the first time that the IAF's new air-to-air refuelers took part in an exercise outside India.¹³² Cope Thunder 2004 presented an excellent opportunity for the IAF to conduct a competitive air combat exercise with foreign aviation forces. The willingness of the IAF to submit valuable resources, such as the Il-78 mid-air refueler represents the amount of importance it attaches to these multilateral exercises. The IAF will continue to participate in these exercises for the foreseeable future not only to re-establish security ties with the United States but also to increase its conventional and unconventional air capabilities against Pakistan or China.

In addition to the United States security relationship with India, one must also take into consideration India's emergence as a global air force. With the successes in Cope India and Cope Thunder, the IAF is emerging as a world-class air force and has recently conducted major exercises in South Africa and with Singapore (in India). India is increasing training with other air forces since this supports its foreign policy of multilateralism, thereby limiting the United State's ability to influence the development of the bilaterally. Since the IAF can only conduct a limited number of exercises a year, this may hurt the emerging defense relationship between the United States and India as India looks to keep its options open and train with other competitive air forces. For example, due to a strong relationship in respect to arms sales, there is a strong possibility that India may conduct air exercises with Israel in the immediate future.

G. CONCLUSION

With the modernization of the IAF via the specific acquisitions aforementioned, India has achieved a conventional edge over its immediate rival, Pakistan, while catching up, in terms of quality, with the PLAAF. After observing the success of the USAF in the Persian Gulf War (and noting the importance of air superiority in any land war), the IAF decided to pursue the Su-30MKI, Phalcon AWACS, and Il-78 air-to-air refuelers as the force multipliers necessary to defeat the PAF and match the PLAAF in any future conventional, or limited wars. While all three of these weapon systems could act in unison to conduct the successful air delivery of a nuclear weapon into Pakistan, the IAF

¹³² "Six IAF Jaguars to Take Part in 'Cope Thunder 2004,'" *Rediff Online*, www.rediff.com. Last accessed January 2005.

will first concentrate on utilizing these platforms in a conventional role. The only exception may be the IAF's utilization of the Su-30MKI to deliver a nuclear weapon into Pakistan as a secondary strategic strike option. Due to China's vast strategic nuclear force advantage over India, India's primary motivation for acquiring these systems is to match the PLAAF in any conflict scenario in the Himalayas. Ironically, the training provided by the USAF to the IAF may further destabilize South Asia since Pakistan will perceive India's advanced weapon systems and training as a threat to its own security, forcing Pakistan to lower its nuclear threshold. Then again, China may perceive the IAF's upgrades and exercises with the USAF as a threat to China's prestige and influence, sparking possible arms race between these two Asian rivals. In addition, the IAF's modernization (through its sophisticated weapon acquisitions and exercises with the USAF) may provoke China and Pakistan to reinforce their security ties as a counter-balance to a perceived Indo-American security alliance. As the IAF continues to modernize and improve its operational capabilities, the United States should not only recognize the government of India's multilateral approach to international relations but the potentially damaging side effects of any future joint-training exercises with the IAF so as not to escalate the already tense security environment in South Asia.

This chapter described how and why the IAF is transforming itself into a global aerospace force. While the acquisition of the three new weapon systems mentioned above will improve the IAF's conventional capabilities, they are only part of the vast upgrades and acquisitions taking place in other areas of the IAF, including jet trainers, combat fighters, UAVs, and air defense systems. The following chapters will analyze the reactions of Pakistan and China to this massive Indian modernization effort. Special attention will be paid to the air forces of these countries to determine how they plan on countering the IAF's latest acquisitions and future upgrades.

THIS PAGE INTENTIONALLY LEFT BLANK

III. PAKISTANI REACTION: REVIVING THE PAKISTANI AIR FORCE

A. INTRODUCTION

In this chapter, I explore the response of the PAF to IAF modernization. It is more than likely that Pakistan will strengthen its military cooperation ties with China to modernize its air force. The reason for this is quite simple: the gap between the PAF and IAF today is remarkable. As of the year 2000, the India-Pakistan fixed wing combat aircraft ratio was 2.67:1.¹³³ Pakistan remains economically and politically constrained, and will be unable to upgrade its air force's conventional capabilities in the immediate future without significant foreign assistance. While the modernization of the IAF threatens the conventional strength of the PAF and its ability to defend itself against a quick and decisive conventional Indian air attack, it does not threaten Pakistan's strategic deterrent of highly mobile and sophisticated nuclear ballistic missiles. The remainder of this chapter analyzes the current disparity between the PAF and the IAF and how this airpower imbalance will lower the nuclear threshold in South Asia.

The current disparity between the Pakistani Air Force (PAF) and the Indian Air Force (IAF) began with the departure of the Soviet Union from Afghanistan. After Soviets left Afghanistan in 1989, the United States disengaged itself from Pakistan and refused to help modernize Pakistan's aging air force. Meanwhile, the Indian economy blossomed in the mid-1990s (thanks to economic liberalization reforms in the early 1990s) and the IAF embarked on a robust modernization campaign. With the tense relationship between Pakistan and India it is critical to assess how Pakistan plans to counter the IAF's massive conventional advantage and predict whether or not Pakistan's tactics will destabilize the fragile security environment in the subcontinent.

This chapter addresses the history of the PAF in respect to the modernization of the IAF, analyzes the PAF's current and future development, and assesses the influences of the external factors on the PAF. Special emphasis is placed on how the United States

¹³³ Rodney W. Jones, "Strategic Stability and Conventional Force Imbalance: Case of South Asia," *Policy Architects International*, http://www.bradford.ac.uk/acad/sassu/publications/StrStab&ConvAsymmetry_Bradford_2.pdf, 6. Last accessed January 2005.

should engage Pakistan in regards to security assistance. After a thorough analysis of the PAF, this chapter reveals how, without foreign assistance, a weaker PAF will be unable to challenge the conventional superiority of the IAF in the future, increasing the imbalance of airpower and forcing Pakistan to lower the nuclear threshold in South Asia.

B. HISTORY AND DEVELOPMENT OF THE PAF

1. Origins of the PAF and Cold War Influences (1947-1979)

Before comparing the PAF with the IAF, it is first necessary to understand that the origins of the PAF and its development during the Cold War. At the time of independence in 1947, the ten squadrons of the Royal Indian Air Force (RIAF) were abruptly divided; seven squadrons (six fighters and one transport) went to India and three squadrons (two fighters and one transport) went to Pakistan.¹³⁴ The PAF's small inventory included only sixteen Tempest fighters and two C-47 Dakotas in serviceable condition (seven Tiger Moth aircraft were ferried to Pakistan from Jodhpur in September 1947).¹³⁵ While the IAF aircraft inventory far outnumbered that of the PAF, the PAF made a determined effort to develop a professional air force capable of defending itself from any external threat. However, to achieve this goal, Pakistan had to look outside its borders and find an ally willing to equip its nascent air force.

After the partition of Pakistan from India, threat perceptions, elite interests and strategic ideas drove the process of conflict and alliance formation between the political centers of Karachi, Delhi, Washington, Moscow, and Beijing.¹³⁶ The relationship formed in the early 1950s between Pakistan and the United States was mutually beneficial. The founder and leader of Pakistan at the time, M.A. Jinnah, sought a U.S. alliance to strengthen Pakistan versus its main enemy India; conversely, the United States remained interested in Pakistani air bases and Pakistani military manpower to use as a counter-balance against communist targets.¹³⁷ The United States saw Pakistan as a strategic partner to help counter the Indo-Soviet alliance and prosecute the Cold War in South Asia;

¹³⁴ Tanham and Agmon, *The Indian Air Force: Trends and Prospects*, 15.

¹³⁵ Lieutenant General (Retired) Sardar F.S. Lodi and Jamie Al-Nasir, "An Introduction to the PAF Pakistan Air Force," http://www.pakaviation.com/PVA/Library/Docs/the_paf.html. Last accessed January 2005.

¹³⁶ Ashok Kapur with A. Jeyaratnam Wilson, *The Foreign Policy of India and her Neighbors* (New York: St. Martin's Press, 1996), 75.

¹³⁷ *Ibid*, 57-59.

for its support, the PAF had a unique opportunity to acquire the military equipment it needed to form a professional air force. Therefore, the alliance of the U.S. and Pakistan during the Cold War endured despite differences during the 1965 Indo-Pakistan War and the 1971 War that separated East Pakistan (modern-day Bangladesh) from West Pakistan. India continued to rely upon the Soviet Union to help modernize its air force but during the 1970s the PAF could still deliver a significant conventional blow to India from the air. This limited parity between both air forces changed significantly following the Soviets departure from Afghanistan.

2. Evolution of PAF during the Soviet Occupation of Afghanistan (1979-1989)

Throughout the 1980s, the PAF experienced substantial military build-up thanks again to significant U.S. military assistance. The United States sought to strengthen military assistance to Pakistan so it could better defend its northern border from the Soviet Union while also supporting the American proxy war in Afghanistan. The Pakistani decision-makers, led primarily by General Zia, wanted to strengthen the PAF since the previous two wars against India proved that a capable air force could provide decisive close-air support and necessary firepower to ground forces (while also enhancing the military's capability to launch an offensive inside enemy territory).¹³⁸ During this timeframe Pakistan's arms procurement decisions were linked strongly with the strategic perception of American security interests in South Asia.¹³⁹

The PAF's major acquisition from the United States in the 1980s included the state-of-the-art F-16A fighter aircraft equipped with AIM-9L missiles; all 36 aircraft were operational by 1986.¹⁴⁰ With improved combat aircraft capable of air interdiction, the PAF performed extremely well during the Soviet occupation of Afghanistan. Nine PAF squadrons flew a total of 10,939 Close Air Patrol (CAP) sorties (roughly 13,275 hours) on the Western Front and shot down eight Soviet aircraft in the process.¹⁴¹ The PAF was extremely pleased with the performance of the heat seeking AIM-9L *Sidewinders* and

¹³⁸ Ayesha Siddiqa-Agha, *Pakistan's Arms Procurement and Military Buildup, 1979-1999* (New York: Palgrave, 2001), 139.

¹³⁹ Ibid, 138.

¹⁴⁰ Abbas Mirza, "The Pakistan Air Force and its Development," *Military Technology*, May 2002, Vol. 26, No. 5; Military Module, 36.

¹⁴¹ Ibid.

Washington even took notice by rushing in about 100 *Sidewinders* to Islamabad in 1985.¹⁴² With the phenomenal performance of the F-16s and *Sidewinders*, the morale of the PAF received a well-needed boost during the 1980s. On the other hand, India was extremely upset at these significant acquisitions and acquired Mig-29s from the Soviets in 1983-1984.¹⁴³ As Soviets withdrew from Afghanistan in 1989, the powerful security ties between the Washington and Islamabad began to unravel.

U.S.-Pakistani relations steadily deteriorated at the end of the Afghan-Soviet War in 1989. Furthermore, the imposition of the Pressler Amendment (1985 amendment passed to check the development of nuclear arms in Pakistan) further damaged the American-Pakistani partnership.¹⁴⁴ In retrospect, the United States is partially responsible for the covert development of Pakistan's nuclear program since the Pakistani leadership had to find ways to increase its security without the military support from the United States. Regardless, the PAF suffered greatly from the cooling of relations between Washington and Islamabad as the delivery of sixty additional F-16s was withheld due to the Pressler amendment. Also, all transactions under the Foreign Military Sales (FMS) agreement were suspended to include training and assistance programs, plus spare parts for the PAF's C-130, T-33, T-37 and TPS-43 radars.¹⁴⁵ These restrictions forced the PAF to rely upon a mix of other foreign aircraft (and foreign technological support) for the defense of Pakistan.

3. PAF Under-Construction (1989-2001)

The PAF realized that it could not trust the United States' inconsistent foreign policy and decided to strengthen its force structure by refurbishing aircraft and parts indigenously. Government funding for the Pakistan Aeronautical Complex (PAC) increased during this period to support the manufacturing, maintenance, refurbishment, and rebuilding of aircraft to include the K-8 jet trainer aircraft, F-6, F-7, Mirage III, and even subsystems of the F-16.¹⁴⁶ In addition to these indigenous projects, the PAF signed three separate contracts for the upgrading of the Chinese F-7s and French Mirage III/Vs so

¹⁴² Siddiq-Agha, *Pakistan's Arms Procurement and Military Buildup, 1979-1999*, 140.

¹⁴³ Ibid, 141.

¹⁴⁴ "External Affairs: Pakistan," *Jane's Sentinel Security Assessment*, South Asia, 20 Feb 2004.

¹⁴⁵ Mirza, "The Pakistan Air Force and its Development," 36-37.

¹⁴⁶ "Pakistan Aeronautical Complex," *Jane's Defense Industry*, 12 January 2004.

that the parity with the IAF did not diminish any further.¹⁴⁷ The PAF's top brass understood the shortcomings of such aircraft as the Chinese F-7 (short endurance) compared to the F-16 but were forced to increase security ties with China (that began in 1966) amidst the restrictions of the Pressler Amendment.¹⁴⁸ Due to the shortage of spare parts for the F-16, PAF pilots flew less and the morale in the force began to decline. Not until the addition of thirty-two Mirage IIIs in November 1997 did the PAF improve its inventory, but regrettably this aircraft would not be able to counter the latest acquisition of the IAF, the SU-30.¹⁴⁹ With the inability of the PAF to attain the best fighter available (whether through corruption, lack of capital, or an inept procurement process), the PAF was left with a bevy of dissimilar aircraft to maintain and had lost the technological edge and operational readiness it had enjoyed in the past. Without sufficient U.S. military support, the PAF failed to modernize in the 1990s while the IAF began a strong modernization push in the middle of the decade.

4. The End of Parity with the IAF (1990-2001)

Despite Pakistan's serious internal threats, such as dangerous Islamic extremists and unchecked tribal groups, the greatest threat to the PAF remains the IAF. Throughout the 1990s, the PAF tried to keep pace with the IAF's gradual modernization. Economics played a major role in the development of the IAF during the 1990s, as India's economic growth rate took off after the liberalization of the economy in 1991. The poor state of Pakistan's national economy put into question whether or not the government could support the armed forces in 1998-1999, especially when the military was looking for about \$10 billion to be spent over seven years for the acquirement of conventional hardware (in addition to the funds needed for the weaponization of a nuclear deterrence).¹⁵⁰ Since Pakistan was unable to develop its air force, due to a lack of U.S. support, a poor economy, and a corrupt bureaucracy, the capabilities of the PAF would be severely diminished in the beginning of the twenty first century.

¹⁴⁷ Siddiqa-Afga, *Pakistan's Arms Procurement and Military Buildup, 1979-1999*, 171-172.

¹⁴⁸ Ibid, 168.

¹⁴⁹ Ibid, 172.

¹⁵⁰ Ibid, 195.

Conversely, IAF modernization skyrocketed. The IAF was the first air force, other than the Russian Air Force to receive the Su-30 MK in 1997, a multi-role fighter with many advanced capabilities; in addition to the procurement of the Su-30 MK, the local manufacture of the fighter was acquired under license by the Hindustan Aeronautics Limited (HAL) to meet the IAF's requirement for five Sukhoi squadrons and the possibility of exporting it.¹⁵¹ Approximately 120 Su-30 MKI (Modernized, Commercial, India) will be manufactured within India with Russian support.¹⁵² This acquisition was a major blow to the PAF and further stretched the technological disparity of high performance aircraft between the IAF and the PAF (reference chart below).

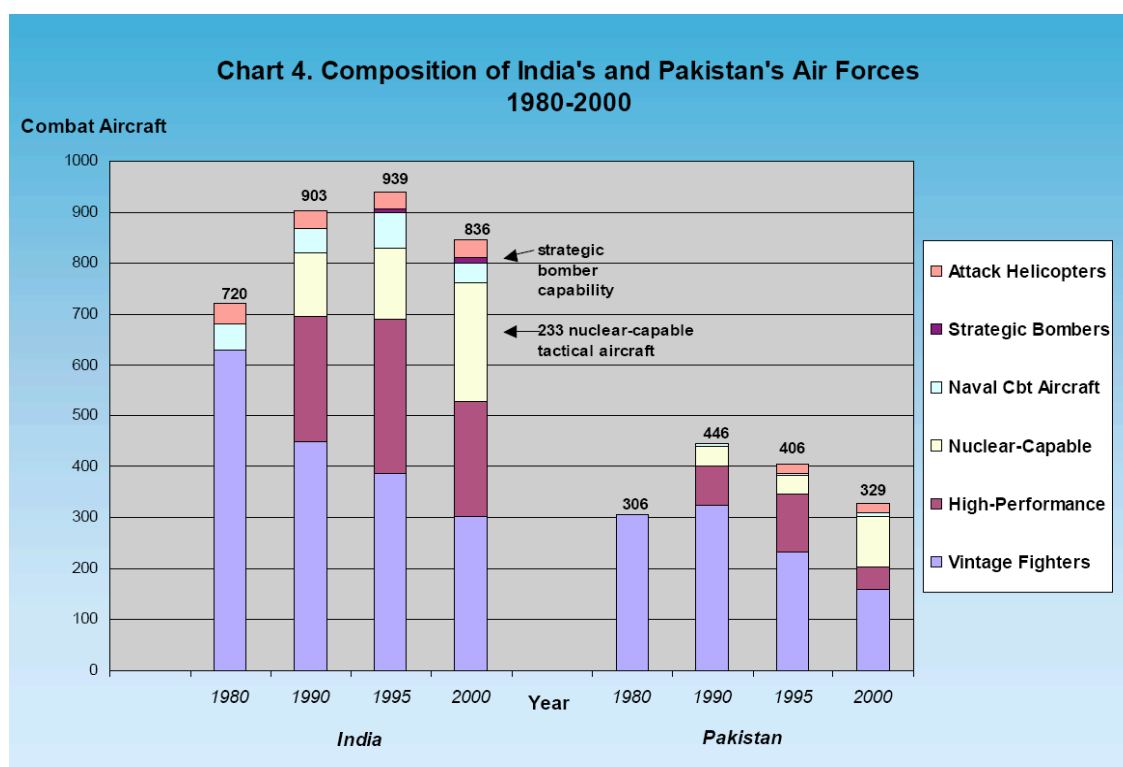


Figure 9. Comparison of the IAF and PAF from 1980 until 2000¹⁵³

¹⁵¹ "Su-30 Provided Punch and License Prospects," *Jane's Defense Weekly*, 12 February 1997, 29.

¹⁵² "India to Build Russian Jet Fighter," *BBC News*, 15 November 2002, <http://news.bbc.co.uk/2/hi/business/2479781.stm>. Last accessed January 2005.

¹⁵³ Jones, "Strategic Stability and Conventional Force Imbalance: Case of South Asia," 13.

The Su-30 MKI represents a quantum leap for the IAF since it is capable of projecting power (3000km range with internal fuel only/5,200km range with mid-air refueling, longer depending on the condition of the pilot) while moving towards network centric warfare with the future integration of India's airborne early warning platforms. In regards to mid-air refueling and airborne early warning capabilities, the IAF recently secured the acquisition of six IL-78 mid air refuelers and two Phalcon Airborne Early Warning Systems from Russia and Israel respectfully. With a mid-air refueling capability and airborne early warning system, the IAF is well on its way towards becoming a world-class air force with the capability to project power beyond its traditional borders to protect its national interests. In the meantime, the gap between the PAF and IAF will continue to widen as Pakistan remains fully engaged in domestic issues. Pakistan's military resources are stretched thin as a majority of the military has taken on the additional duty of reconstructing the country's civil institutions (even to the extent of having soldiers teach classes in public schools) to deter the rise of militant Islam.¹⁵⁴

C. PRESENT AND FUTURE PAF DEVELOPMENT

1. Learning from the Kargil Conflict and the 2001/2002 Crisis

The Pakistan military made a strategic move to occupy the route from Kargil to Ladakh in May of 1999 with the assistance of well-armed Islamist fighters.¹⁵⁵ Since this was an operation primarily led by the Pakistani Army, the PAF did not contribute much to this operation other than in an air defense role. On the other hand, the IAF was able to use its laser technology, newly acquired from the French, mounted upon its Mirage 2000s; with this newfound capability, the IAF was able to target the mujahideen fighters in the mountain peaks of Kashmir.¹⁵⁶ The main obstacles faced by air power in the twenty thousand foot peaks of Kargil were the cumulative effect of a high altitude environment, a heightened Surface to Air Missile (SAM) threat, and equipment and training deficiencies that diminished the effectiveness of Close Air Support (CAS) as a source of responsive

¹⁵⁴ Comments from Lieutenant General Tariq Waseen Ghazi, Director of the Pakistani National Defense College, in a visit to the Naval Postgraduate School on 15 September 2004.

¹⁵⁵ Christopher Jaffrelot (editor), *A History of Pakistan and its Origins* (London: Wimbledon Publishing Company, 2002), 128.

¹⁵⁶ Robert Marquand, "India and Pakistan – Now Pausing to Rearm? Kashmir Conflict Leaves both Countries Questioning the Quality of their Weapons," *Christian Science Monitor*, 14 July 1991.

fire in support of ground maneuver.¹⁵⁷ While the PAF did not play a major role in the Kargil operation, both air forces gained invaluable experience on how to conduct high altitude air operations in support of ground troops that the U.S. would later face in Operation Enduring Freedom (this time in Afghanistan). Towards the end of the 21st century, it appeared that the PAF faced a more difficult task than ever in countering the IAF's advantage in numbers, modernity, and experience; chiefly, the IAF became more capable of sustaining across-the-board missions ranging from air interdiction/strike, to air defense, to ground support.¹⁵⁸

While both air forces gained a significant amount of knowledge in regards to high altitude combat during the Kargil conflict, the IAF discovered that it needed to improve its mobilization of forces following the 2001/2002 crisis. During this crisis, IAF fighter aircraft moved from Northern India (deployed to protect the border with China) to Western India to bring massive firepower in any conventional war with Pakistan. Since it took the IAF days to move its combat aircraft to the Western border, the IAF is now dedicated to supporting the Indian Army's "Cold Start" doctrine whereby smaller combined units can be quickly deployed to strike decisively.¹⁵⁹ If this new doctrine is to come to fruition for the Indian military, it will severely threaten the security of Pakistan since the international community would not have the time to react and step in as it did during the 2001/2002 crises. Therefore, it is incumbent on the PAF to not only improve its conventional capability but its nuclear capability to deter the IAF's latest "Cold Start" strategy.

¹⁵⁷ Marcus P. Acosta, "High Altitude Warfare: The Kargil Conflict and the Future," *Naval Postgraduate School Thesis*, June 2003, 63.

¹⁵⁸ Brian Cloughley, "India's and Pakistan's Air Power Potential Hindered by Lack of Joint Headquarters," *Jane's International Defense Review*, 01 July 1998, 23.

¹⁵⁹ Air Commodore Tariq M. Ashraf, Pakistan Air Force, "Doctrinal Awakening of the Indian Armed Forces," *Military Review*, November – December 2004, 59.

2. The PAF's Air Defense and Nuclear Roles

In any conventional war between Pakistan and India, the role of the PAF is to fully safeguard Pakistan's sovereignty and territorial integrity.¹⁶⁰ Since the IAF will continue to develop precision-guided munitions capable of targeting militant camps and militant logistics capabilities across the Line of Control (LOC), the PAF will have to continually enhance its air defense capabilities. In addition to its traditional air defense role, the PAF must be capable of maintaining its nuclear role if it hopes to deter the IAF's adventures into limited war.¹⁶¹ Therefore, the PAF should pay as much attention to its nuclear capabilities as its conventional air defense capabilities in order to deter an Indian conventional military attack on Pakistani territory.

The PAF's doctrine and employment for the aerial delivery of nuclear weapons is very advanced. For instance, Pakistan has better control of its nuclear capable aircraft than India since the Pakistan's military controls all facets of nuclear production and employment beneath the Strategic Plans Division (SPD). On the contrary, the Indian military has only just begun to establish a Strategic Command responsible for India's nuclear weapons triad. The Indian military continues to struggle with civilian control of the nuclear weapons program. While India outnumbers Pakistan in all manners of nuclear delivery systems, Pakistan has an asymmetric nuclear advantage thanks to its advanced strategic nuclear strike doctrine and its nuclear capable F-16s flown by extremely skillful pilots. Thus, the PAF will continue to improve its nuclear doctrine and employment since this nuclear role is essential to Pakistan's survival as it would be unable to counter a conventional Indian attack through conventional military means.

While the PAF continues to improve its nuclear doctrine, it has been unable to modernize its conventional doctrine. Basically, the PAF's conventional doctrine is struggling to keep pace with a rapidly evolving IAF doctrine based on rapid mobilization of forces, precision strike capabilities, and highly capable Intelligence, Surveillance, and Reconnaissance (ISR) assets. The consequences of Pakistan falling behind the latest

¹⁶⁰ Comments made by the Prime Minister of Pakistan, Shaukat Aziz, in a visit to PAF Base Chaklal. Aziz further argued that secure borders are essential to peace and that a strong defense is the best deterrent for the country. "Pakistan Pursues Deterrent Capability in Conventional and Strategic Areas: PM," *Xinshua News Agency – CEIS*, 13 January 2005.

¹⁶¹ According to Peter R. Lavoy in "Fighting Terrorism, Avoiding War The Indo-Pakistani Situation," *Joint Forces Quarterly*, Autumn 2002, the PAF F-16s and Mirage 2000s are probably nuclear capable, 33.

technological and doctrinal advances versus India are extremely dangerous. With the IAF's push towards network centric warfare, the IAF will be able to not only deter or even intercept a PAF nuclear attack but also coerce Pakistan with accurate attacks on specific targets (thanks to the IAF's advancements in airborne early warning, space, command and control, and ISR). If Pakistan wants to increase its chances of successfully conducting a nuclear attack from the air on strategic Indian targets it needs to invest heavily in ISR assets and move towards network centric warfare. The PAF's nuclear doctrine will begin to meet significant obstacles if the PAF cannot compete in a campaign of network centric warfare whereby all systems (missile systems on the ground, ground troops, ISR assets, and nuclear capable platforms) are interconnected. The PAF risks the chances of being defeated by the IAF in not only a nuclear conflict, but a conventional or even limited war if it cannot successfully integrate all of its resources. With this in mind, and with little support from Western sources, Pakistan is looking more and more to China to supply it with the assets mentioned above to improve not only its aerial nuclear option but modernize many facets of the PAF.

3. Increased Defense Ties with China to Modernize the PAF

Although Pakistan has committed itself to fight the War on Terrorism, the United States has not returned the favor to Pakistan by providing the equipment necessary to modernize its air force. Since the Pakistani military perceives the IAF as a real and menacing threat, it will do everything in its power to develop an air force that can counter the IAF's superiority.¹⁶² In the next fiscal year the majority of the Pakistani defense budget will be dedicated to improving the status of the PAF.¹⁶³ With strong aerospace defense ties between both China and Pakistan already in place, the PAF is well on its way to modernizing its forces. For instance, a joint venture between the Chinese Chengdu Aircraft Industry Corporation (CAC) and Pakistani Aeronautical Complex (PAC) will begin initial production of 16 aircraft in 2006; the designation of the aircraft in the PAF will be the Joint Fighter-17 (JF-17) *Thunder* (reference photo below).¹⁶⁴

¹⁶² Lieutenant General Tariq Waseen Ghazi (Pakistani Army), 15 September 2004.

¹⁶³ Ibid.

¹⁶⁴ "FC-1/JF-17 Multirole Fighter Aircraft," *Sino Defense*, <http://www.sinodefence.com/airforce/fighter/fc1.asp>. Last accessed January 2005.



Figure 10. PAF Joint Strike Fighter (JF-17)¹⁶⁵

The senior Pakistani leadership remains convinced that India will continue to play the “China card” in order to receive military aid and dual use technologies from the United States. Since Pakistan perceives a long-term Indo-American alliance as a major security threat, it will work with China to develop new technologies. China has already begun to increase its research and development in regards to developing high-tech systems and has already made some significant breakthroughs in not only state of the art aircraft but electronic warfare as well.¹⁶⁶ Pakistan believes that with its unprecedented economic growth, China will be able to fund its defense projects and advance the modernization of the People’s Liberation Army Air Force (PLAAF). In addition, a senior member of the Pakistani Army argued that in ten to fifteen years China will have a modern air force.¹⁶⁷ Therefore, the PAF will directly benefit from the modernization of the PLAAF as it will gain a significant amount of assistance in the fields of combat aircraft, electronic warfare, and ISR. Unless the United States can somehow improve its defense relationship with Pakistan, China will become Pakistan’s primary supplier of military hardware for the foreseeable future.

¹⁶⁵ “FC-1/JF-17 Multirole Fighter Aircraft,” *Sino Defense*, <http://www.sinodefence.com/airforce/fighter/fc1.asp>. The FC-1 in the export scheme and the Pakistani Air Force (PAF) designation JF-17, which stands for Joint Fighter-17. It is expected that the PAF will acquire 150 JF-17s to replace its F-7P/PG fleet. Last accessed January 2005.

¹⁶⁶ Lieutenant General Tariq Waseen Ghazi (Pakistani Army), 15 September 2004.

¹⁶⁷ Ibid.

D. EXTERNAL INFLUENCES ON THE PAF

1. The State of Pakistan after 9/11

After the attacks of September 11, the Bush administration quickly realized that Pakistan was indispensable in pursuing its campaign in Afghanistan to both break up Bin Laden's terrorist networks and put an end to the Taliban regime.¹⁶⁸ If America's War on Terrorism is to succeed, it needs the help of not only Pakistan's military bases, but Pakistani intelligence as well. Security ties between both countries were immediately renewed as all U.S. sanctions connected to Pakistan's nuclear weapons program (mainly the 1978 Symington Amendment and the 1990 Pressler Amendment) were lifted once Musharraf pledged his "unstinted cooperation in the fight against terrorism."¹⁶⁹ Pakistan was immediately propelled into the world spotlight, and Musharraf, the military general who rose to power only after a military coup in 1999, became America's most important ally in the war against terrorism.

Even before being tossed into the international spotlight, Musharraf tried to pull Pakistan out of its diplomatic isolation (widely considered a pariah nation after the nuclear weapons tests in the spring of 1998); therefore, in the summer of 2001, Musharraf, who by then had become President, made the first high-level visit of a Pakistani leader to India in over 14 years.¹⁷⁰ Unfortunately, such diplomatic efforts and the war on terrorism couldn't ease the tense relationship between Islamabad and Delhi. An attack on India's Parliament on December 13, 2001 by a suicide bomber further strained this relationship.¹⁷¹ As both countries mobilized their forces along their shared borders in the spring of 2002, escalating the chances of an all out nuclear war in South Asia, cooler heads prevailed on both sides with pressure from Washington. Afterwards both countries eventually began Confidence Building Measures (CBMs) to improve their relationship (mainly through the mechanism of the South Asian Association of Regional Cooperation, SAARC). While Pakistan improved its international prestige, badly damaged during the 1990s, by aligning itself with the United States after September 11th, it still had trouble bringing the Islamists

¹⁶⁸ Jaffrelot, *A History of Pakistan and its Origins*, 262.

¹⁶⁹ Ibid, 265-266.

¹⁷⁰ Ibid, 265.

¹⁷¹ "Background Notes: Pakistan," *United States Department of State: Bureau of South Asian Affairs*, <http://www.state.gov/r/pa/ei/bgn/3453.htm>. Last accessed January 2005.

in Pakistan in line (exemplified by the two terrorist assassination attempts on Musharraf's life towards the end of 2003). The relationship between the United States and Pakistan must remain strong if the United States is going to find elements of Al Qaida and the Taliban along the Afghan – Pakistan border and if Musharraf is going to lead his people out of dismal poverty and discontent with American aid.

The latest strain on American-Pakistani relations is the pardon of nuclear scientists A.Q. Khan, considered the “father of Pakistan's nuclear program,” by President Musharraf after Khan admitted that he had proliferated nuclear weapons. It is apparent that Washington exhibited significant restraint in respect to this event and highlights how important a strong U.S.-Pakistani relationship is to the United States. While allegations exist that there is an “understood agreement” whereby Pakistan would allow U.S. troops inside Pakistan to track down Al-Qaida and Taliban elements as long as the United States let Musharraf handle Khan, this information has yet to be verified. Regardless, Islamabad revamped its military forces to deal with the internal security problems along the Pakistan – Afghanistan border, pleasing Washington by showing the U.S. that Pakistan was willing to take a proactive stance against terrorism; hopefully these measures were not too little, too late.

2. U.S.-PAF Relations after 9/11: F-16s to the PAF?

While the new relationship between the United States and Pakistan is one mainly based on necessity (fighting the War on Terrorism for the United States and state survival for Pakistan), the relationship between the United States and the PAF has been slow-going. On the positive side, the immediate lifting of sanctions following 11 September 2001 not only meant that Pakistan would be able to obtain loans from America, but also send soldiers to the U.S. for military training (something that was impossible since 1990).¹⁷² Then again, in a December 2001 visit by U.S. Secretary of Defense Donald Rumsfeld to Islamabad, Rumsfeld dodged Musharraf's request for a delivery of F-16s (originally 28 F-16s were to be sent to the PAF, but the order was cancelled due to Pakistani nuclear testing in the 1990s); instead, Rumsfeld only offered up parts for the existing PAF F-16s.¹⁷³

¹⁷² Jaffrelot, *A History of Pakistan and its Origins*, 266.

¹⁷³ Ibid, 279.

Security ties between the United States and Pakistan were finally reaffirmed when President Musharraf's visited the United States just last year and President Bush announced that the U.S intended to provide Pakistan with \$3 billion in economic and military aid over the next five years.¹⁷⁴ So where does this leave the American– PAF relationship today? In respect to the fight on terrorism, the PAF was one of the first services to offer its help as President Musharraf accepted a U.S. request for a long-term presence at an air base in Jacobabad, southwestern Pakistan (a standby air base for the PAF) shortly after 11 September 2001, to serve as a key facility for the U.S. military's peacekeeping or counterterrorism operations in Afghanistan.¹⁷⁵ In terms of actual aircraft, Islamabad agreed to purchase six C-130 military transport aircraft from Lockheed Martin for approximately \$75 million under a Foreign Military Financing (FMF) grant (reference Table 4. U.S. Assistance to Pakistan).¹⁷⁶ Furthermore, Congress was notified in 2003 of another pending Foreign Military Sale arrangement with Pakistan reportedly worth \$155 million that will allow Pakistan to receive six Aerostat surveillance radars (this would mark the first major arms sale to Pakistan in over a decade).¹⁷⁷ While these surveillance radars will release some of the pressure placed on PAF air patrols, Washington's current military aid plan is focused exclusively on combating terrorism; however, the PAF is more concerned with updating its fighter aircraft in respect to its most significant threat, the IAF.

¹⁷⁴ "Background Notes: Pakistan," United States Department of State: Bureau of South Asian Affairs.

¹⁷⁵ Kamran Khan and John Pomfret, "U.S. Extended Presence Agreed to by Pakistan; Air Base to Serve as Key Facility in Region," *The Washington Post*, 14 December, 2001,

¹⁷⁶ K. Alan Kronstad, Foreign Affairs, Defense, and Trade Division, "Pakistan – U.S. Relations," *Congressional Research Service, The Library of Congress*, updated 2 December 2003, <http://islamabad.usembassy.gov/wwwhhott.html>, CRS-7. Last accessed January 2005.

¹⁷⁷ Ibid.

Table 1. U.S. Assistance to Pakistan, FY2001-FY2004
(in millions of U.S. dollars)

Program or Account	FY2001 Actual	FY2002 Actual	FY2003 Allocation	FY2004 Request
CSH	-	14.0 ^a	15.6	25.0
DA	-	10.0	34.5	50.0
ERMA	-	25.0	-	-
ESF	-	624.5	188.0 ^b	200.0
FMF	-	75.0	224.5	75.0
IMET	-	0.9	1.0	1.3
INCLE	3.5	90.5 ^c	31.0	38.0
NADR	-	10.1	-	5.0
PKO	-	220.0	-	-
Subtotal	\$3.5	\$1,070.0	\$494.6	\$394.3
P.L.480 Title I ^e	0.5	10.0	15.0	-
P.L.480 Title II ^e	1.9	5.1	12.4	(^d)
Section 416(b) ^e	85.1	75.7	-	-
Total	\$91.0	\$1,160.8	\$522.0	\$394.3

Sources: U.S. Departments of State and Agriculture; U.S. Agency for International Development.

Abbreviations:

CSH: Child Survival and Health
 DA: Development Assistance
 ERMA: Emergency Refugee and Migration Assistance
 ESF: Economic Support Fund
 FMF: Foreign Military Financing
 IMET: International Military Education and Training
 INCLE: International Narcotics Control and Law Enforcement (includes border security)
 NADR: Nonproliferation, Anti-Terrorism, Demining, and Related
 PKO: Peacekeeping Operations
 P.L.480 Title I: Trade and Development Assistance food aid (loans)
 P.L.480 Title II: Emergency and Private Assistance food aid (grants)
 Section 416(b): The Agricultural Act of 1949, as amended (surplus agricultural commodity donations)

Notes:

- Includes \$9 million in U.N. Family Planning Funds that currently are on hold pending presidential determination.
- Congress authorized Pakistan to use this ESF allocation to cancel approximately \$1 billion in concessional debt to the U.S. government.
- Includes \$73 million for border security projects continuing in FY2003.
- Title II food aid accounts generally are held in reserve.
- Food aid amounts do not include what can be significant transportation costs.

Table 5. United States Assistance to Pakistan¹⁷⁸

¹⁷⁸ Kronstad, CRS-7.

While Washington has not said “yes” or “no” to the sale of F-16s to the PAF in the past, the PAF intends to take up the United States’ offer to upgrade the existing F-16s with capabilities that would allow the service to add a Beyond Visual Range Air to Air Missile (BVRAAM), improve digitized electronics, update structural support changes, and improve radars.¹⁷⁹ The PAF prefers the F-16 option because it already possesses the necessary logistical training infrastructure to support the aircraft.¹⁸⁰ There are indications that the PAF’s well-known desire to add additional F-16s necessary to close the gap of high-tech aircraft in respect to India may actually take shape in the immediate future. In a statement made by the Pakistan Air Chief (Air Marshall Kaleem Saadat) on 14 September 2004, Pakistan may expect some F-16s from the US while delivery of two of the six C-130s is expected in December.¹⁸¹ Air Marshall Saadat was quoted as saying, “Pakistan had asked for 70 F-16s but the Americans had indicated that they might settle for 18 but that might happen after the US presidential elections.”¹⁸² Referring to the difficulties Pakistan had to face due to “stringent political decisions by the US administration” he said, “Pakistan Air Force is looking for various options to meet its hi-tech requirements; that Swedish Griffin and China’s F-10 remain leading contenders; that whichever of these aircraft is selected, it will meet our high-tech requirements.”¹⁸³

Thus, the PAF will exhaust all options in acquiring a high-tech combat aircraft to meet its modernization needs and counter the IAF’s rapid modernization efforts. For example, Pakistan agreed in July to purchase 50 Mirage III/V fighter jets and 150 Mirage III/V engines from Libya to maintain the PAF’s existing fleet of Mirages (estimated at 180 aircraft).¹⁸⁴ With this purchase it appears that the PAF is dedicated to its fleet of Mirages to support its multirole and anti-ship roles for the immediate future.¹⁸⁵ As mentioned earlier, defense ties with China will certainly strengthen over the long-term as the

¹⁷⁹ Andrew Koch, “Interview with Air Chief Marshal Kaleem Saadat, Pakistan Air Force Chief of Staff,” *Jane’s Defense Weekly*, 08 October 2003.

¹⁸⁰ Ibid.

¹⁸¹ “Pakistan Air Force Chief Expects F-16s From U.S.,” *Dawn*, 15 September 2004.

¹⁸² Ibid.

¹⁸³ Ibid.

¹⁸⁴ “Pakistan Buys Fleet of Mirage Jets from Libya,” *Agence France-Presse Islamabad*, 06 July 2004, <http://www.defensenews.com/>. Last accessed January 2005.

¹⁸⁵ Ibid.

relationship is mutually beneficial for both parties; Pakistan can upgrade its antiquated weapons systems while China's relationship with Pakistan will continue to irritate India forcing India to concentrate military resources on both borders.

3. PAF Concerns and Other Possible Acquisitions

While the Pakistani military is well aware of the importance of destroying terrorist elements within its own borders, the PAF is more concerned with the threat of the IAF's rapid modernization (as it was a decade ago). Again it is important to emphasize the importance of Pakistan's security perceptions in the region. The PAF is very concerned with the perceived pro-India policy of the United States. It makes sense that the United States to have a vested interest in the economic and military strength of India to counter-balance the threat of the regional hegemonic power, China. As of late, the PAF's perceived notions of a pro-India policy may be well founded due to the recent air combat exercise held in India. In February 2004, in the combat exercises codenamed "Cope India 04," the Pacific Command of the U.S. Air Force (USAF) pitted its F-15C air superiority fighters against the IAF's Mig-21, Mig-29, Sukhoi-30, and Mirage 2000 at Gwalior Air Base in the central state of Madhya Pradesh.¹⁸⁶ This exercise simulated Beyond Visual Range Combat, high value asset protection, and a number of the low and high altitude combat missions.¹⁸⁷ While joint exercises between the USAF and the IAF are a serious concern, the PAF is more concerned with the increased capabilities of the IAF's hi-tech fighters (specifically the BVRAAM capability of the Su-30 MKI with an estimated range of 16 to 20 nautical miles) and the IAF's latest attainment of the jointly developed American – Israeli Phalcon airborne early warning system.¹⁸⁸ Currently the PAF does not have an answer to the Su30MKIs BVRAAM capability.¹⁸⁹ In addition, the IAF Phalcon AWACS will threaten the PAF's air defense system (by monitoring ground control intercept communications) and deny the PAF the ability to utilize terrain masking in mountainous areas, such as Kashmir. Even more threatening to Pakistan's security is that the IAF Phalcon AWACS may be capable of identifying the deployment and disposition

¹⁸⁶ "Biggest ever Indo-US Joint Air Exercise Begins," *Outlook India.com*, 16 February 2004, http://www.outlookindia.com/pti_news.asp?id=201813. Last accessed January 2005.

¹⁸⁷ Ibid.

¹⁸⁸ Interview with PAF Group Captain Khawar Hussein on 17 March 2004, Naval Postgraduate School.

¹⁸⁹ Ibid.

of Pakistan's strategic assets (nuclear force of ballistic missiles and command and control nodes) resulting in the possible loss of Pakistani secrecy vital to the maintenance of Pakistan's minimum deterrence.¹⁹⁰

Since network centric warfare will be the key to victory in any conventional or nuclear conflict, a major priority for the PAF is the procurement of a six to ten mid-sized airborne early-warning and control aircraft, like the E-2C Hawkeye or a variant of the Embraer EMB-145 to control the skies.¹⁹¹ The PAF is tentatively scheduled to receive seven Swedish ERIEYE Airborne Early Warning and Control System equipped on SAAB aircraft that should help shore up its air defense capabilities versus the IAF.¹⁹² Lastly, the PAF is interested in obtaining a number of unmanned aerial vehicles (UAVs) to conduct surveillance and reconnaissance missions along the country's highly contested borders with a range of 200 to 500 kilometers.¹⁹³ The PAF may have a good chance of obtaining these UAVs if it can convince the U.S. government that they will be utilized to help fight the war on terror. The direction and competitiveness of the PAF will depend upon its ability to modernize and obtain the high-tech fighters, AWACS/AEW platforms, and UAVs or else it will continue to fall further behind the technological advancement of its main threat, the IAF.

E. CONCLUSION

The PAF is content to continue military exchanges and joint exercises with the United States, but in reality, it would prefer the acquisition of advanced military equipment to counter its main threat, the IAF.¹⁹⁴ The United States is hesitant to provide full-scale military support (in the form of F-16s or advanced AWACS/AEW platforms) because it believes that Pakistan first needs to allocate its resources towards its economy,

¹⁹⁰ Group Captain Khawar Hussein, "Air Power Imbalance in South Asia: Post Nuclearisation," Naval Postgraduate School, 5 April 2004, 12.

¹⁹¹ Group Captain Khawar Hussein, "Air Power Imbalance in South Asia: Post Nuclearisation."

¹⁹² It is estimated that the PAF wouldn't receive its first AEW&C system until 2006. The ERIEYE AEW&C system can manage airborne early warning, intercept communications, conduct surveillance along the borders and conduct search and rescue operations. "Pakistan to Receive Swedish ERIEYE AEW&C System and SAAB Aircrafts," 14 July 2004, http://www.pakistanidefence.com/news/FullNews/2004/July2004/AWECS_DEAL.htm. Last accessed January 2005.

¹⁹³ Koch, , "Interview with Air Chief Marshal Kaleem Saadat, Pakistan Air Force Chief of Staff."

¹⁹⁴ Interview with PAF Group Captain Khawar Hussein on 17 March 2004, Naval Postgraduate School.

educational system, human rights, and internal security. The PAF will receive additional U.S. military equipment in the immediate future, but it may be heavily weighted to those systems that help fight terrorism.

Without significant foreign assistance from the United States, Pakistan will significantly increase its defense ties with China to help it rebuild its air force. By continuing to cooperate closely with China, Pakistan will not only obtain sophisticated fighter aircraft but would achieve its goal of keeping the IAF somewhat off balance. Future American policy recommendations for these two South Asian nuclear powers are difficult to formulate since neither will adhere to the Non-Proliferation Treaty (NPT) yet are not seen as potential targets of counter-proliferation by the American government. In order to limit Sino-Pakistani military cooperation and improve upon its strong bilateral relationship, Washington should sell Pakistan F-16s. If Washington does not sell F-16s to Pakistan, the IAF will continue to widen its conventional superiority versus the PAF forcing Pakistan to strengthen its nuclear program and further escalating the chances of nuclear war in the subcontinent.

THIS PAGE INTENTIONALLY LEFT BLANK

IV. CHINA'S RESPONSE TO IAF'S MODERNIZATION EFFORTS

A. INTRODUCTION

As a successful economic, nuclear-capable and democratic nation-state, India will threaten the credibility and regional prestige of the communist-led People's Republic of China (PRC) for the foreseeable future. In response to a more powerful India, China has consistently sought to maintain and expand the autonomy of the smaller South Asian states while avoiding any direct confrontations against New Delhi.¹⁹⁵ Alternatively, China's primary security concerns are the possible independence of Taiwan, an unstable Korea, the remilitarization of Japan, and the potential hostility of the United States.¹⁹⁶ While most American defense analysts focus exclusively on China's military capabilities in a Taiwan scenario, little attention is paid to a potential conflict with South Asia's greatest military power, India. It is all the more baffling to understand this lack of analysis since Indian pride has not yet fully recovered from the humiliating defeat dealt to it by China in the 1962 Sino-Indian War. Furthermore, the amazing pace of IAF modernization threatens to manifest itself into an arms race between the IAF and the People's Liberation Army Air Force (PLAAF), threatening regional stability. This chapter analyzes China's reaction (specifically, the response of the PLAAF) to IAF modernization in order to determine whether or not the robust pace of the IAF's modernization threatens Chinese national security. My analysis reveals that China will maintain a nuclear advantage over India for the long term but is currently incapable of decidedly defeating India in a conventional air war.

As a rational actor in a chaotic world, China will defend its security interests at all costs, even if it means joining with weaker states to confront a global hegemonic power. Therefore, China utilizes its diplomatic, economic, and military instruments of national power to support a balance of power approach to the unstable security dynamic in South Asia. Since the 1998 nuclear tests in South Asia and the continued development of

¹⁹⁵ Leo E. Rose, "India and China: Forging a New Relationship," in Shalendra D. Sharma (ed.), *The Asia-Pacific in the New Millennium: Geopolitics, Security, and Foreign Policy* (Berkeley, CA: Institute of East Asian Studies, University of California, Berkeley, 2000), 224-238 cited in *India's Emerging Nuclear Posture*, ed. Ashley Tellis, 733.

¹⁹⁶ Tellis, *India's Emerging Nuclear Posture*, 733.

nuclear weapons in the region, have made it so China can no longer neglect this significant security threat along its southern border. Furthermore, as an emerging Asian power, India has begun to threaten China's credibility throughout the region. Thus, this chapter assesses these two major issues by analyzing the Sino-Indian relationship in three dimensions: China's threat perceptions and overall relationship with India, China's nuclear capabilities versus India's, and China's conventional air force capabilities compared with India. Each section analyzes China's specific threat perceptions towards India and assesses whether or not the PRC is capable of defeating India in any major nuclear or conventional air war.

B. CHINA'S THREAT PERCEPTION AND SINO-INDIAN TIES

In May of 1998, India declared that it had successfully conducted a series of nuclear tests in the Rajasthan desert (located in northwest India), which caught the entire international community by complete surprise. Only a few weeks later, Pakistan responded to India's nuclear tests by conducting its own in the Chagai Hills of Baluchistan (located in southwest Pakistan). With the arrival of nuclear weapons to South Asia, China immediately turned its attention to the potential security implications of this new threat along its southern border. From a realist point of view, China perceives itself as a legitimate nation-state in an unstable international system where lasting peace is not possible but temporary peace may be attainable by building coalitions and alliances among weaker states against the hegemonic ambitions of others.¹⁹⁷ Therefore, Beijing endorses a balancing strategy in respect to both India and Pakistan as the best way to maintain peace and stability in this volatile region. Since China has long considered South Asia to be its own "backyard" (China shares a 3400 kilometer border with India and Pakistan), it is not only frustrated with the acquisition of nuclear weapons by India and Pakistan, but also fearful that countries such as Japan (a potential enemy), may now seek to acquire nuclear weapons for their own specific security interests.¹⁹⁸ In this section, I

¹⁹⁷ Lyman Miller, NS 3667 Chinese Foreign Policy Handout, "Comparing Traditional Chinese, Marxist-Leninist, and Western Worldviews," 5.

¹⁹⁸ Liao Yameng, "Expert Analyzes the 'Balancing' Strategies of China, India, and Pakistan," 7 Nov 2003, *Hong Kong Wen Wei Po* (Internet Version), FBIS Translated Text, FBIS-CHI-2003-1107.

explain China's threat perceptions and initial reaction to the 1998 nuclear tests and in also explain how China has dealt with India diplomatically, economically, and militarily since India's nuclear tests.

1. China's Present Threat Perception and Outlook on Global Nuclear Weapons Development

China's overall threat perception and outlook on global nuclear weapons development drives its balancing strategy in South Asia. China's principal security concerns are the erosion of its nuclear deterrent vis a vis an increasingly aggressive American national/theater missile defense plan and Taiwan's opposition to reunification.¹⁹⁹ In addition to these two major threats, China does not trust a technologically advanced and plutonium-rich Japan, nor is it comfortable with how Russia may respond to a U.S. deployment of a national missile defense system.²⁰⁰ With regional threats throughout its periphery (to include Russia, Taiwan, Japan, South Korea, India, and America's growing presence in Central Asia), China cannot defend itself without balancing with other weaker states to counter these traditional enemies. In respect to nuclear weapons development in South Asia, China has traditionally supported Pakistan's efforts in obtaining advanced ballistic missiles in order to counter the emerging strength of India's own nuclear program.²⁰¹ Since both China and India share similarities that could cause them to become rivals within world economic and political structures in the foreseeable future, China will continue its strong military ties with Pakistan as a means of keeping India "pre-occupied."²⁰² While China's immediate security concerns are the emergence of an American national missile defense system and the Taiwan's opposition to reunification, its ability to contain nuclear weapons development to South Asia will have long term security implications. In order to better assess how China will approach India

¹⁹⁹ Marco Di Capua, "Nuclear Security in Asia: A Global Affair," *Proliferation Prevention and Arms Control Program*, Lawrence Livermore National Laboratory, September 2000, as submitted to the Seventh ISODARCO-Beijing Seminar on Arms Control, Xi'an China, October 8-12, 2000, 3.

²⁰⁰ Ibid, 2-3.

²⁰¹ China was well aware that India had a nuclear weapons program in place prior to the 1998 tests because India had already conducted its first nuclear test in 1974.

²⁰² Fu Xiaoqiang and Kuang Ji, "Avoiding the Clash: Paving the Way for Sino-Indian Cooperation," *Beijing Review*, November 13, 2003, 44.

as a potential enemy in the future, it is vital to understand how the PRC reacted to India's nuclear tests and how it has approached India through diplomatic and economic channels since those tests.

2. China's Reaction to India's 1998 Nuclear Tests and Current Sino-Indian Diplomatic Ties

One of India's main reasons for conducting its 1998 nuclear tests was to protect itself from a nuclear China.²⁰³ Chinese statements after India's nuclear tests refute this point. For example, the Ministry of Foreign Affairs of the People's Republic of China stated on 14 May 1998 that, "Ever since China possessed nuclear weapons, it has advocated the comprehensive prohibition and complete destruction of nuclear weapons unilaterally and unconditionally undertaken not to use or threaten to use nuclear weapons against non-nuclear weapons states and nuclear free zones."²⁰⁴ Therefore, China quickly condemned India's nuclear tests through open diplomatic channels arguing that India did not need a deterrent to China's growing military power, but that India wanted to prove itself as the main power of South Asia."²⁰⁵

China's initial reaction to India's nuclear tests was one of condemnation. Today, Chinese officials are making significant efforts towards improving historically strained political ties with India in an effort to balance the tense security environment in South Asia. For instance, Sino-Indian cooperation has slowly improved over the last few years since both countries have worked towards resolving its boundary issues.²⁰⁶ During Prime Minister Atal Vajpayee's July 2003 visit to India, he signed an agreement whereby India for the first time referred to Tibet as Tibet Autonomous Region, China's name for it.²⁰⁷ In return, China recognized India's claims to the Himalayan state of Sikkim by agreeing to a

²⁰³ From text of 13 May 1998 letter from Indian Prime Minister Vajpayee to U.S. President Clinton, posted on the Embassy of India, Washington D.C. website located at <http://www.indianembassy.org/indusrel/pmletter.htm>. Last accessed March 2005.

²⁰⁴ Statement of the Ministry of Foreign Affairs of the People's Republic of China, 14 May 1998, as found on the NGO Committee on Disarmament, Peace and Security homepage at <http://disarm.igc.org>.

²⁰⁵ "China and the Nuclear Tests in South Asia," *China Profiles*, as found on the Nuclear Threat Initiative Homepage at <http://www.nti.org/db/china/nsascris.htm>. Last accessed March 2005.

²⁰⁶ Fu Xiaoqiang and Kuang Ji, "Avoiding the Clash: Paving the Way for Sino-Indian Cooperation," 44. Sino-Indian boundary issues were initiated in June 2003 when Indian Prime Minister Atal Bihari Vajpayee visited China and both sides signed the Declaration for Relations and Comprehensive Cooperation.

²⁰⁷ "A Thaw in India-China Relations," *South Asia Monitor*, Center for Strategic and International Studies, 1 September 2003, www.csis.org/saprog/sam/sam62.pdf.

border trade regime with adjoining areas of China.²⁰⁸ The border dispute is still far from over as India claims part of Chinese-controlled northern Kashmir and the remote area of Aksai Chin while China claims large parts of the northeastern India.²⁰⁹

As India's population and prestige in the international community continue to grow, China has decided to expand political ties with India as it seeks multipolarization in the international political arena.²¹⁰ China remains optimistic about future Sino-Indian ties as both countries have the capability to promote security, stability, and prosperity over most of Asia if they decide to cooperate with each other. For instance, Dai Bingguo, the Chinese special representative on the Sino-Indian border issue and vice minister of foreign affairs, argued that, "We appreciate and support all positive efforts that help ease and stabilize the South Asian situation...we sincerely hope that Sino-Indian relations can rise to a new level."²¹¹ While bilateral relations are gradually improving between both countries, Beijing's insistence on Indian nuclear rollback and New Delhi's demand for Chinese clarification of its suspected nuclear and missile assistance to Pakistan will potentially damage full scale cooperation between both countries in the immediate future.²¹²

On a secondary note, China will continue to try to balance the security dynamic between India and Pakistan by continuing its diplomatic support to its traditional ally, Pakistan. While China perceives Pakistan as an important partner in the war on terrorism, it is also well aware that a strong Pakistan will help balance India's growing power. China is constantly promoting exchanges between itself and Pakistan to gain Pakistan's allegiance and foster greater parity in South Asia. For instance, as recently as 14 Dec 2004, Pakistani Prime Minister Shaukat Aziz said before leaving to China that, "Pakistan and China are strategic partners that play a major, moderating influence in this part of the world...we will meet with the leaders of China to discuss diplomatic, political, and

²⁰⁸ "A Thaw in India-China Relations."

²⁰⁹ Fu Xiaoqiang and Kuang Ji, "Avoiding the Clash: Paving the Way for Sino-Indian Cooperation," 44.

²¹⁰ Ibid.

²¹¹ Jian Yaping, "Dai Bingguo Says There Are Vast Prospects for Sino-Indian Cooperation," *Beijing Xinhua Domestic Service*, 30 July 2004, FBIS Translated Text, FBIS Document Number: FBIS-CHI-2004-0730.

²¹² "China and the Nuclear Tests in South Asia," *China Profile*.

economic issues to take our friendship to greater heights.”²¹³ Expect political ties between Beijing and Islamabad to strengthen as China seeks to promote a strong Pakistan that can keep India preoccupied and perhaps even slow down India’s growing strength in the region. Therefore, China continues to exert its diplomatic power to influence the security situation in South Asia in an attempt to not only control nuclear weapons development, but also contain an increasingly powerful India.

3. Beijing’s Economic Ties with New Delhi

As the eighth largest economy in the world with an average double digit Gross Domestic Product (GDP) growth rate over the last twenty-five years, China remains one of the world’s largest manufacturing bases. Conversely, India’s GDP growth rate has also expanded greatly over the last ten years, as India becomes the global base for Information Technology (IT) services.²¹⁴ As India’s economy continues to grow, it is very likely that China will see India as an economic competitor that may threaten China’s influence throughout all of Asia. With India’s rapid economic growth and unchecked nuclear weapons program, China may perceive India as trying to exert its influence outside of South Asia. India, like China, is already looking towards strengthening its trade relationships with Japan, South Korea, and a number of Southeast Asian nations. While trade ties between both countries are gradually increasing (Sino-Indian trade volume in the early 1990s was only about \$200 million, but last year it reached \$7.6 billion), India’s trade has dramatically increased with a number of different countries.²¹⁵ China does not have the skills to compete with India in the global IT sector and India is beginning to make inroads in the Asian manufacturing sector. India is gradually moving into the manufacturing industry through Japanese and Korean companies investing heavily in the Indian auto-making industry. Therefore, China can only exert limited economic influence upon India (in terms of trade, tariffs, etc.). On the other hand, China will continue to

²¹³ “Pakistan PM Aziz Leaves for China, Says Strategic Ties Major Influence in Region,” *Islamabad PTV World in English*, 14 December 2004, FBIS Transcribed Text, SAP2004121000050.

²¹⁴ Xiao Zhou, “India’s Great Economic Potential,” *Beijing Review*, 13 November 2003.

²¹⁵ Jian Yaping, “Dai Bingguo Says There Are Vast Prospects for Sino-Indian Cooperation.”

invest the money it gains from global trade on the modernization of its military and nuclear weapons programs that will undoubtedly threaten India's long term security.²¹⁶

4. Beijing's Military Relationship with New Delhi

Since the 1962 Sino-Indian Border War, Beijing has conducted only limited military exchanges with New Delhi. As a result of India's nuclear tests in 1998, China realized that it would have to modernize its military and upgrade its nuclear arsenal in response to this new security threat along its southern border. While mutual suspicion still exists in regards to the specific military and nuclear weapons modernization programs in both countries, Beijing has recently sought to strengthen multi-polar security by welcoming Indian military forces in a variety of exercises and war games. Beijing's goal is to neutralize U.S. unilateralism by promoting the development of global multilateralism in which both China and India would have a greater interest.²¹⁷ China's foreign policy approach in terms of security has made some moderate progress in Sino-Indian military relations. For example, the Indian Defense Ministry declared in May of 2003 that the two armies will carry out mutual warship visits and that India will send its military officers to study at Chinese military colleges.²¹⁸ Specifically, Chinese and Indian navies conducted joint search-and-rescue exercises in the East China Sea waters near Shanghai on 14 November 2004; this was the first joint military exercise since the two countries formally established diplomatic relations.²¹⁹ Beijing will continue to explore future military training exercises with New Delhi since it allows Beijing to maintain some form of influence in South Asian security. By remaining engaged with the major military power of South Asia, Beijing feels that it can better monitor New Delhi's true military aspirations in Asia.

²¹⁶ According to Hatsuhsa Takashima, spokesman for the Foreign Ministry of Japan, China has been increasing its military budget by 10 percent annually for the past 10 years. From James Brooke's 22 February 2005 New York Times article entitled, "Japan's Ties to China: Strong Trade, Shaky Politics," <http://www.nytimes.com/2005/02/22/international/asia/22japan.html>. Last accessed February 2005.

²¹⁷ Dr. Subhash Kapila, "China's Quest for Strategic Co-operation with India: Perspectives," *South Asia Analysis Group*, 24 February 2004, <http://www.saag.org/papers10/paper936html>. Last accessed February 2005.

²¹⁸ Fu Xiaoqiang and Kuang Ji, "Avoiding the Clash: Paving the Way for Sino-Indian Cooperation," 44.

²¹⁹ Ts'ai Chih-ch'eng, "Chinese and Indian Navies Conduct Joint Search-and-Rescue Exercise in East China Sea," *Hong Kong Ta Kung Pao* (Internet Version), 15 November 2003, FBIS Translated Text, CPP20031115000027.

5. Summing Up China's Threat Perceptions of South Asia – India on the Mind

The development and modernization of nuclear weapons in South Asia remains a major security concern for Chinese defense planners. In order to confine nuclear weapons development to South Asia and promote stability in the region, China has adapted a balanced strategy towards India and Pakistan. As a legitimate nation-state in an unstable international system, Beijing utilizes its traditional elements of diplomatic, economic, and military powers to promote a balanced strategy with India and Pakistan in an effort to ease tensions between these two nuclear states. Since China is stronger than Pakistan, China will have more success in exerting its military and economic instruments of power upon its traditional ally. With respect to India, China will have to rely more on diplomacy since it cannot influence India using military force or by applying economic pressure. While there is still time for cooperation between both China and India, it is most likely that these two countries will become peer competitors and potential enemies over the long term, especially if the United States continues to apply pressure on a nuclear capable India as a counterbalance to a strong China. China's balanced approach to the development of nuclear weapons in South Asia will be successful over the short term; however, with an increasingly powerful Indian military and economy, China's balanced approach will be difficult to sustain over the long term and will eventually threaten China's security in its own "backyard." With a better understanding of China's threat perceptions in South Asia, especially with respect to India's emergence as a regional power and potential enemy, it is essential to explore whether or not China is capable of defeating India in a nuclear war.

C. ASSESSING CHINA'S NUCLEAR CAPABILITY VERSUS INDIA

China conducted its first nuclear test in 1964. Since then, China has made moderate progress in the development of its nuclear weapons program. In order to prevent the proliferation of nuclear weapons to other nation-states in particular to India, China became a member of the world's only legitimate nuclear club, as defined by the Nuclear Non-Proliferation Treaty (NPT). The other four members are the United States, United Kingdom, France, and Russia. India is not a member of this exclusive club and therefore covertly developed its own nuclear weapon program, which was ultimately revealed by the nuclear tests it conducted in May of 1998. While India will continue to develop its nuclear weapons program, it will not be able to catch up with China in the immediate

future since China has had more time and has invested more resources into its nuclear program than India. Therefore, I will assess China's nuclear doctrine and then compare China's nuclear capability versus that of India's to show why China can defeat India in a nuclear war.

1. China's Nuclear Doctrine and Strategy

Since the PRC has not released its official nuclear doctrine and strategy, most of what we know comes from studies by members of the PLA, statements by prominent PRC/PLA leaders or other scholarly journals. From these sources, it is clear that China faces the prospect of restoring a minimum deterrence that takes into account possible deployment of a U.S. missile defense system but may also have to look into a limited deterrence with regard to India or even an expansion of its arsenals to develop a limited deterrence across the board.²²⁰ In order to be prepared for any of these options, China's nuclear doctrine and strategy appear to be focused on a deterrent of any of the nuclear powered states that may threaten China's national security. In light of this, China remains dedicated towards spending the majority of its defense budget on creating a viable nuclear force. Specifically, Chinese weapons modernization efforts are currently focused on achieving greater range, payload, accuracy, survivability, and tactical advantage through the deployment of the DF-31 missile, the possible deployment of multiple warheads, and the deployment of short range-missiles.²²¹ The following section will further explore China's nuclear capability and analyze how effectively it could strike strategic targets within India.

2. China's Nuclear Capability

The most ambitious military modernization efforts are currently taking place in China's strategic (or nuclear) rocket forces, known as the PLA Second Artillery. China assesses ballistic missiles as the best instrument for securing its goals in Taiwan without actual invasion.²²² Hence, China's growing force of approximately 500 Short Range Ballistic Missiles (SRBMs), believed to be based in the Nanjing Military Region directly

²²⁰ Marco Di Capua, "Nuclear Security in Asia: A Global Affair," *Proliferation Prevention and Arms Control Program*, Lawrence Livermore National Laboratory, September 2000, as submitted to the Seventh ISODARCO-Beijing Seminar on Arms Control, Xi'an China, October 8-12, 2000, 4.

²²¹ Ibid.

²²² Robert A. Manning, Ronald Montaperto, and Brad Roberts, *China, Nuclear Weapons, and Arms Control*, 29.

opposite Taiwan, represent the greatest threat to regional stability in Asia.²²³ The gradual improvement of precision in these conventional, tactical ballistic missiles greatly threatens not only Taiwan's ability to defend itself in any major conflict but India's security since China could easily target Indian airfields and military command centers if these SRBMs were deployed along the Sino-Indian border. Furthermore, these SRBMs may be quickly weaponized to carry nuclear weapons creating an even greater threat to Indian security. China is continuing development of SRBMs because it believes that if the United States were to enter a conflict between China and Taiwan, its ballistic missile force would be the best way to even the playing field against such a technologically superior enemy.²²⁴ The Chinese put great faith in the modernization of their ballistic missile force (in terms of increased production and precision) to best support their security goals of protecting China, reclaiming Taiwan and deterring India. With additional developments in conventionally armed medium-range ballistic missiles (MRBMs), China's conventional and nuclear missile strike force will threaten China's neighbors, India in particular, symbolizing the PLA's power and influence in the region.²²⁵

The PLA's Second Artillery is doing a decent job of overcoming its traditional restrictions (lack of funds and training) to develop a respectable SRBM capability essential in intimidating China's neighbors. While China has developed a full range of ballistic missiles, possesses a nuclear triad of forces, and is accelerating its development in new missiles, it still remains behind the other four nuclear powers and suffers from weaknesses in the following: transitioning from liquid rocket fuel to solid rocket fuel, lack of strategic reconnaissance platforms, unprepared (not hardened) silos, GPS technology, and most importantly, the ability to launch on warning (since the missiles are not fueled and the warheads are not mated).²²⁶ Since China perceives its Second Artillery as the one service that gives Beijing its best "bang for the buck" (in terms of regional and

²²³ Secretary of Defense, "Annual Report on the Military Power of the People's Republic of China," July, 2003.

²²⁴ Mark Stokes, *China's Strategic Modernization: Implications for the United States*, 97.

²²⁵ Secretary of Defense, "Annual Report on the Military Power of the People's Republic of China,"

²²⁶ David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects* (Berkeley: University of California Press, 2002), 280.

international influence), these strategic missile deficiencies will be overcome in the long term as China shifts from a doctrine of minimum deterrence to limited deterrence.

China's overall nuclear force modernization is focused on improving its nuclear deterrence by increasing the number of warheads that can target the United States.²²⁷ While China has no more than twenty warheads capable of striking the American mainland, it is modernizing its intercontinental ballistic missiles (ICBMs), submarine launched ballistic missiles (SLBMs), and road mobile ballistic missiles.²²⁸ While this number is relatively small, compared to the massive arsenals of the United States and Russia, these ICBMs can reach a number of strategic targets within India.

With the emphasis on engineering, not to mention the espionage encouraged to obtain foreign missile technology, China will gradually improve the accuracy and range of its strategic nuclear forces by applying pressure on India to possibly develop and deploy some form of missile defense system. This classic security dilemma will further stress Sino-Indian relations in the future and further endanger the fragile security situation in South Asia as India continues to bicker with its main nuclear rival, Pakistan. China's ambitious nuclear modernization efforts reflect its desire for foreign policy to minimize not only American, but Indian influence in Asia and strengthen China's international power and prestige.

3. India's Nuclear Doctrine

In January 2003, India finally announced its Nuclear Doctrine and the establishment of a Strategic Forces Command aimed at removing any existing ambivalence surrounding India's nuclear policy.²²⁹ With the formation of this Strategic Forces Command, India began to move from a passive nuclear doctrine that focused exclusively on defensive issues to a more flexible nuclear position dedicated to building and maintaining a credible minimal deterrent.²³⁰ While no mention was made of

²²⁷ Hans M. Kirstensen and Shannon N. Kile, "Nuclear Arms Control, Non-Proliferation and Ballistic Missile Defense", 620.

²²⁸ Data on China's nuclear weapons taken from the "Natural Resources Defense Council Nuclear Notebook: China's Nuclear Forces 1999," *The Bulletin of the Atomic Scientists*, May-June 1999, from Paul Godwin's, "China's Nuclear Forces: An Assessment," in *Current History*, September 1999, 260.

²²⁹ "India Armed Forces," *Jane's Sentinel Security Assessment*, South Asia, posted 16 April 2004, www.janes.com. Last accessed June 2004.

²³⁰ Ibid.

conventional capability or nuclear triad, it has been assessed that India's primary means of nuclear delivery will be from the air until its ballistic missile capability has matured.

4. India's Nuclear Capabilities Versus China

India's nuclear tests in May of 1998 were conducted to assure its citizens that nuclear weapons would protect and promote national security.²³¹ In addition, the party in power at that time, the Bharatiya Janata Party (BJP), argued that India conducted the nuclear tests because China represented a long-term threat to Indian security.²³² Presently, India has few options for nuclear weapons delivery. Due to the poor performance of its land-based ballistic missile systems, the Prithvi and the Agni, India has had to increasingly rely upon its aircraft to deliver nuclear weapons.

Since India perceives China as its long-term security threat, the employment of India's sophisticated combat aircraft in a nuclear role demonstrates India's strategic intent to deter and match China.²³³ In reality, it is highly unlikely that India could successfully deliver a nuclear weapon on any significant target in China since these nuclear-capable aircraft (Jaguar, Mirage 2000, Mig-27, and Su-30MKI) would have to cover such a large distance at low levels in order to avoid China's sophisticated Integrated Air Defense System (IADS).²³⁴ For example, if the IAF's most advanced and sophisticated combat aircraft, the Su-30MKI, was forward deployed along the border with China to execute a nuclear mission it would only get 1500km into China, which is well short of the 2500km needed to reach high value targets in Beijing (reference graph below). Thus, it will be extremely difficult for the Su-30MKI, or any other IAF nuclear-capable aircraft, to deliver a nuclear weapon inside China due to the lack of strategic targets within the aircraft's combat radius, the strength of the Chinese IADS, and the caution of the IAF leadership to commit a high valued asset on an extremely risky mission.²³⁵

²³¹ 13 May 1998 letter from Indian Prime Minister Vajpayee to U.S. President Clinton. "NUCLEAR ANXIETY; Indian's Letter to Clinton On the Nuclear Testing, *New York Times*, 13 May 1998, Section A, 14.

²³² Ibid.

²³³ Ibid.

²³⁴ Tellis, *India's Emerging Nuclear Posture*, 552.

²³⁵ Ibid, 543. Ashley Tellis takes a different viewpoint by arguing that the Mirage 2000-H would be the best platform for a nuclear delivery mission because of the aircraft's combat radius, avionics, defensive weaponry, and countermeasure systems.

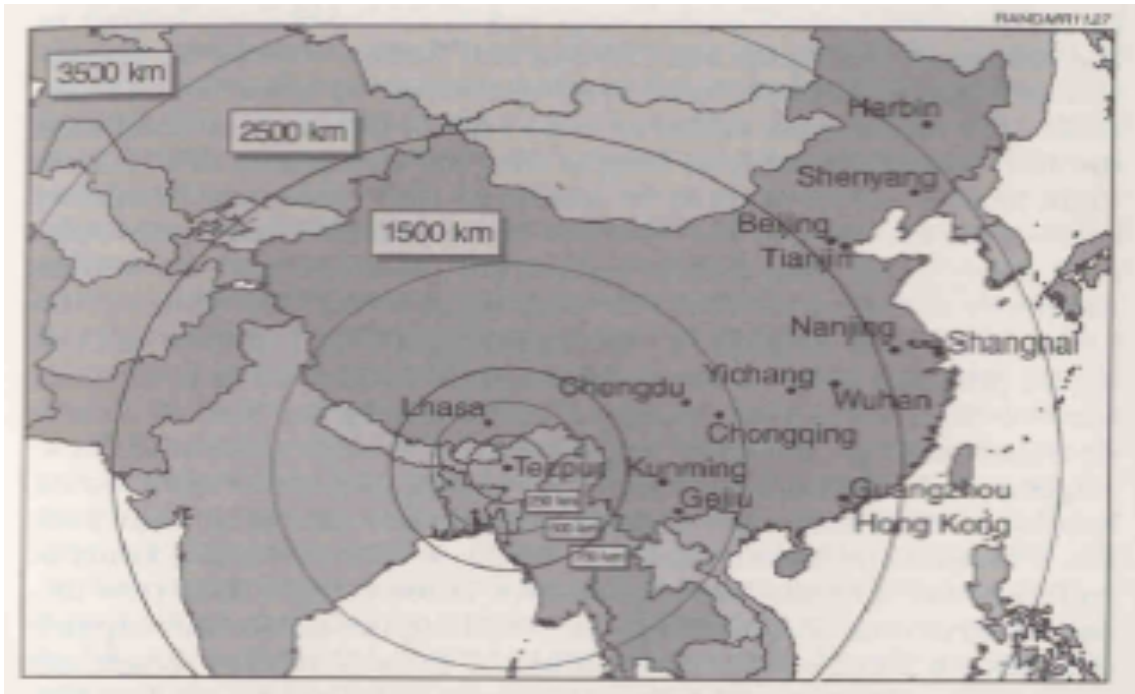


Figure 11. India's Strategic Nuclear Reach from Tezpur.²³⁶

5. China's Nuclear Capabilities Far Surpass Those of India's

While New Delhi will continue to improve its nuclear weapons capability, it will be unable to match China's nuclear weapons arsenal. India does not have the specific technology and government support to develop the vast numbers of Short-Range Ballistic Missiles (SRBM) and Intermediate-Range Ballistic Missiles (IRBM) that is already a part of the inventory of the Chinese Strategic Rocket Forces. India is far more likely to strike China with its nuclear capable combat aircraft instead of its short-range and inconsistent Prithvi and Agni systems. The chances of a successful Indian nuclear attack on strategic Chinese targets from the air are extremely unlikely due to the limitations on the aircraft combat radius and the significant air defenses of the PLA. Furthermore, China is pursuing a nuclear triad as a means to deter other potential threats (such as the United States and Taiwan). Thus, if China was ever forced into any nuclear war with India, it could easily defeat India since it has a larger nuclear weapons arsenal that can hit practically any

²³⁶ Ibid, 553. Note that Su-30MKIs based out of Tezpur would be unable to hit targets in Beijing if they were unrefueled. Basically, the combat radius of the Su-30MKI (1500km) falls far short of the 2500km necessary to target Beijing

strategic Indian target. India argued that it needed nuclear weapons to defend itself from China but in reality, India's nuclear weapons are incapable of defeating China in any nuclear scenario.

D. COMPARING THE PEOPLE'S LIBERATION ARMY AIR FORCE TO THE INDIAN AIR FORCE

The PLAAF is in the process of modernizing its aging combat aircraft and pursuing advanced weapon systems that will allow them to fight local wars under hi-tech conditions²³⁷ While the PLAAF inventory greatly outnumbers that of the IAF, the IAF is also acquiring and integrating sophisticated weapon systems to close the gap on the PLAAF. In terms of actual flying capabilities, the IAF pilots are more capable than PLAAF pilots since they receive more flying hours and are better trained in tactics, techniques and procedures thanks to advanced training with foreign aviation forces. The following sections will compare the PLAAF with the IAF and demonstrate why the PLAAF is currently incapable of defeating the IAF in any conventional conflict.

1. PLAAF Doctrine and Strategy

While the PLAAF has not publicly released its official doctrine, we have a decent ideal of their doctrine through the public statements of its leaders and the limited articles released from various offices within the PLA and PLAAF. For example, the former head of China's Central Military Commission (CMC), Jiang Zemin, stated in 1999 that, "The Air Force must step up the ability to attack in the air and develop the equipment to do so. We must gradually move from air defense of our national territory to an Air Force with both attacking and defensive capabilities."²³⁸ In order to promote the PLA's overall goal of conducting "local, limited war under hi-tech conditions," the PLAAF's doctrine is beginning to move from the traditional defense of the homeland to a force capable of conducting quick and decisive offensive operations. While the PLAAF's official doctrine remains ambiguous, we can ascertain that its doctrine will still support the PLA by conducting air campaigns based on an "active initiative," which means to turn a passive

²³⁷ Xue Litai and John Wilson Lewis, "China's Search for a Modern Air Force." *International Security*, Vol.24, No.1 (Summer 1999), 92.

²³⁸ Zhang Nongke and Weng Huainan, "A Leap Over the Past 50 Years – Viewing Development in the People's Air Force From the Four Grand Military Parades," *Beijing Renmin Ribao Overseas Edition*, 11 November 1999, FBIS Translated Text, FTS199911121000870.

posture into an active posture and to turn defense into offense.²³⁹ After the stunning success of U.S. airpower during the first Gulf War, the Chinese leadership realized that it had to quickly modernize the PLAAF because a nation cannot plan to fight a hi-tech war without having an effective air arm.²⁴⁰

2. PLAAF Conventional Capabilities

Without the massive Soviet aid and advisors (strongly represented in the 1950s) China has been unable to modernize its air force on its own. As the PLAAF fleet grew during the 1980s, the growth was one of quantity, not quality, as the PLAAF was filled with obsolete aircraft and weapons systems; by 1988 half of the PLAAF aircraft were operational.²⁴¹ While these limitations impeded the PLAAF's combat readiness, the collapse of the Soviet Union permitted China to import vast amounts of cheap Russian aircraft and training from the 1990s until present day. By specifically acquiring sophisticated combat fighters, such as the Su-27 and Su-30, the PLAAF is modernizing according to Beijing's security and foreign policy goals. While training deficiencies still remain, for example, the PLAAF does not train over water, it is making the right acquisitions in the realm of foreign arms sales. Due to the lack of fourth generation fighters, the PLAAF is no match for U.S. air power; however, China is making moderate progress in competing with India by pursuing aerial refueling capabilities, improved ISR, and adequate airborne early warning platforms.²⁴²

The PLAAF's modernization efforts are based according to the criteria of "new, quality, modify, and introduce."²⁴³ The focus of modernization in the PLAAF is focused on upgrading the entire inventory of combat and support aircraft, especially tactical fighter/bomber and air defense aircraft; in addition, the PLAAF is reequipping combat aircraft with new missile strike systems and electronic command and control systems for

²³⁹ Kenneth Allen, Krumel, Pollak, *China's Air Force Enters the 21st Century* (Santa Monica: RAND, 1999), 106.

²⁴⁰ Xue Litai and John Wilson Lewis, "China's Search for a Modern Air Force," 92.

²⁴¹ Ibid," 87-88.

²⁴² Bates Gill and Michael O'Hanlon, "China's Hollow Military," *The National Interest* No.53 (Summer 1999), 57.

²⁴³ Allen, Krumel, and Pollak, *China's Air Force Enters the 21st Century*, 121.

the aircraft and aerial weaponry.²⁴⁴ Furthermore, the PLAAF is attempting to streamline its inventory whereby its massive numbers should be cut in half to approximately 2000 jet aircraft by 2005.²⁴⁵ In the following sections, I will highlight some of the major weapon systems in the PLAAF inventory and assess their advantages and disadvantages in any conventional conflict versus India.

With respect to its goal of acquiring hi-tech multi-role fighters, China placed orders with Russia in recent years for the delivery of 75 to 80 Su-27Sk and Su-30MKK fighters; furthermore, China procured the license for the launch of its own production, with Russian technical assistance of 150 to 200 Sukhoi fighters in about 10 years.²⁴⁶ In terms of indigenous production, the Chinese are pursuing the development of the J-10 to help it obtain a fourth generation fighter with stealth technology. By acquiring these advanced combat aircrafts, the PLAAF may not only dominate the skies in any conventional conflict against Taiwan but also challenge the advanced combat aircraft of the IAF (especially after its acquisition of the Su-30MKI). On the other hand, China is over-reliant on ground control intercept and its pilots are less capable than those in the IAF due primarily to lack of funding to pay for flight hours and a lack of spare parts for aging Soviet era aircraft. In addition, the PLAAF is not equipped to conduct night-flying operations.²⁴⁷ If the PLAAF fighters were to fly against the IAF fighters in any conventional conflict, especially in a border-war scenario, the IAF would hold the tactical advantage.

For the time being, the PLAAF will have to seriously upgrade its ISR, aerial refueling, and even precision ground attack capability if it hopes to regain some form of parity with the IAF. While the PLAAF is attempting to create a credible Airborne Early Warning and Control System (AWACS), it settled for the second best system in the arms market, the Russian A-50 Mainstay because the United States prevented the Chinese from purchasing the Phalcon AWACS from Israel. Conversely, the IAF will receive three of

²⁴⁴ Colonel (Retired) Vyacheslav Vladimirovich Baskakov and Captain First Rank (Retired) Aleksandr Fedorovich Gorshkov, "The PLAAF is Winning the Skies," *Moscow Nezavisimoye Voyennoye Oborazheniye*, 27 February 2004, FBIS Translated Text, CEP20040227000353.

²⁴⁵ Allen, Krumel, and Pollak, *China's Air Force Enters the 21st Century*, 163.

²⁴⁶ Ibid.

²⁴⁷ Ibid, 125.

the Phalcon AWACS and have the ability to integrate its advanced fighters, heavy lift aircraft, unmanned aerial vehicles, and aerial refuelers in any air campaign against China.

The IAF has more advanced UAV programs in progress than China does therefore, in any conventional conflict intelligence will play a crucial role. Due to its dominance in acquiring and integrating hi-tech combat aircraft, AWACS, aerial refuelers, and UAVs, plus its robust training program, the IAF could decidedly defeat the slowly modernizing PLAAF in any conventional air campaign, specifically any Himalayan border-type scenario.

3. IAF Doctrine and Strategy

The IAF was the first service in India to publish its own doctrine in 1996. Since its independence in 1947, the Indian Army has dominated the budget and has driven the agenda of the Indian military. With the lessons learned from the successful air campaigns in the first Gulf War and in Kosovo, high-ranking Indian military officials realized the importance of airpower and decided to make the modernization of the air force one of its top priorities. Recently, the IAF has transitioned into a force dedicated exclusively to defense of Indian territory to one capable of accomplishing a variety of missions (close air support, deep strike operations, etc).

4. IAF Conventional Capabilities

The IAF is wisely upgrading, acquiring and integrating a variety of weapon systems in its effort to create a global air force. The IAF successfully closed the conventional gap with the PLAAF by concentrating on quality rather than quantity. The acquisition and integration of the Su-30MKI, Phalcon Airborne Early Warning System and Il-78 mid-air refueler described in Chapter II act as a force multiplier in any conventional conflict. For the purposes of comparison with the PLAAF, I will briefly analyze these weapon systems and explain why the IAF can defeat the PLAAF in any conventional conflict.

The Su-30MKI increases the ability of the IAF to defeat the PLAAF's combat aircraft and gain air superiority in any border conflict with China. The PLAAF, with over 2,000 combat aircraft has an enormous quantitative advantage over India in a conventional

sense.²⁴⁸ Conversely, in comparison with India, China has been extremely slow in modernizing its air force, mainly due to corruption and inadequacies in its military industrial complex. With the Su-30MKI, the IAF has made a modest effort to catch up with the PLAAF in terms of quality. In any case, The PLAAF realizes that the IAF is significantly modernizing its combat aircraft capability and are acquiring highly capable Su-27 and Su-30MKs. The modernization efforts of both air forces represent not only the desire to defend their respective territories, but to project force as an emerging regional power. Depending on how long it will take the PLAAF to modernize (estimates range from 10 to 20 more years), the IAF's fleet of combat aircraft (led by the Su-30MKI) is presently capable of defending Indian territory from a Chinese air attack.

India's acquisition of the Phalcon AWACS gives it a tactical advantage versus China. For instance, since the Phalcon system can pick out enemy aircraft flying hundreds of miles away in all weather, day or night, or even those flying at low altitude, it could counter any conventional PLAAF threat in the North or Northeast of India well in advance.²⁴⁹ This advanced warning is vital in any conventional confrontation with China since India is still modernizing its air defense and interceptor aircraft (already moving in the right direction with the Su-30MKI) that will take some time to develop. The Phalcon AWACS closes the qualitative conventional gap with China and giving India the early warning it needs to properly defend itself from any "nasty surprises" along the Himalayas in order to avert any future wars with timely and diplomatic action.²⁵⁰ Although it will take some time to integrate the Su-30MKI with the Phalcon AWACS, India must accomplish this task if it hopes to move towards network centric warfare and keep China somewhat off balance. With India and China's history of conventional conflict, and mutual suspicions, it will be relatively easy for both countries to misconstrue one

²⁴⁸ A.K. Sachdev, "Modernization of the Chinese Air Force," *Strategic Analysis: A Monthly Journal of the IDSA*, Vol. XXIII, No. 6, September 1999.

²⁴⁹ Biman Mukherji, "India and Israel Sign One Billion Dollar Defense Deal," *Agence France Presse*, 5 March 2004.

²⁵⁰ Air Commodore Ramesh V. Phadke in his working paper for International Security and Cooperation (CISAC), Stanford University, entitled, "People's Liberation Army Air Force (PLAAF): Shifting Airpower Balance and Challenges to India's Security," February 2002, 20.

another's motives.²⁵¹ Thus, the IAF also acquired the Phalcon AWACS to substantially upgrade its early warning capability to meet any contingency with the PLAAF in the Himalayas.²⁵²

The Il-78 air-to-air refueler also increases the IAF's combat capability versus PLAAF. According to an anonymous IAF officer, "With such air-to-air refuelers, we will be able to fly our air superiority fighters like the Su-30MKIs for over 10 hours at a stretch without landing. Similarly, longer air defense missions will also be possible. It will enhance our capabilities against China."²⁵³ China is still in the process of diversifying its air force (in the past, 70 percent of the PLAAF consisted of combat fighters); therefore, the PLAAF is pursuing its own mid-air refueler to project power along its borders.²⁵⁴ At the present, one regiment of about 10 H-6U tankers, converted from H-6 bombers, support a regiment of J-8D fighters as China is looking to procure Il-78M tankers from Russia.²⁵⁵ For the time being, the IAF maintains a competitive advantage over the PLAAF's mid-air capabilities in terms of quality since the IAF Il-78s have already begun to conduct air-to-air refueling with the IAF's advanced Su-30MKI.

5. India Capable of "Winning the Skies" Versus China

With the successful deployment of the IAF Il-78 mid air refueler to Alaska in support of exercise COPE THUNDER, held this past June with the USAF and other air forces, the IAF demonstrated its capability to project power outside its borders while the PLAAF is still unable to achieve this capability. Furthermore, the IAF has done a better job of integrating all of its air assets and achieving a more sophisticated level of C4I than the PLAAF. The IAF is definitely further along the PLAAF in its goal of creating a global air force due to the acquisitions it has made, the high level proficiency of its pilots and ability to gain invaluable flying experience by exercising with other capable air forces.

²⁵¹ Air Commodore Ramesh V. Phadke in his working paper for International Security and Cooperation (CISAC), Stanford University, entitled, "People's Liberation Army Air Force (PLAAF): Shifting Airpower Balance and Challenges to India's Security," February 2002, 20.

²⁵² Phadke, , "People's Liberation Army Air Force (PLAAF): Shifting Airpower Balance and Challenges to India's Security," 20.

²⁵³ "India Seeks Uzbek-Made Aircraft to Enhance Capability Against China," *BBC Monitoring International Reports*, 03 September 2002.

²⁵⁴ John Wilson Lewis and Xue Litai, "China's Search for a Modern Air Force," 82.

²⁵⁵ "China's Air Force," *Jane's Sentinel Security Assessment – China and Northeast Asia*, 27 May 2004.

Therefore, China would be unable to sustain any conventional air victories due to India's strong and modern air force that continues to improve on strategic lift, precision strike, and ISR.

E. CONCLUSION

As a rational actor in a chaotic world, China will defend its security interests at all costs. With the arrival of nuclear weapons in South Asia in 1998 and the growing economic and military strength of India, Chinese defense planners are clearly tracking the modernization of Indian nuclear weapons programs and the IAF. This chapter reveals that the China can decisively defeat India in any nuclear confrontation, but is currently unable to match the IAF in any conventional conflict, specifically along the border region of the Himalayas. This assessment revealed the weakness in PLAAF modernization compared to the modernization of the IAF due to funding constraints and the actual flying proficiencies of both air forces. Furthermore, the IAF has greater experience than the PLAAF in actual combat operations with its many conflicts, even as recently as the 1999 Kargil conflict, against Pakistan. While China will maintain its nuclear advantage over India in the long term, India will continue to modernize its air arm in an effort to become Asia's strongest air force and to better promote its regional strategic interests.

It is vital for American intelligence analysts to analyze the development and modernization of the nuclear and air capabilities of both China and India because both nations are beginning to emerge as main powers throughout Asia, in conjunction with Japan. According to the Central Intelligence Agency Director, Peter Goss, "Beijing's military modernization and military buildup is tilting the balance of power in the Taiwan Strait and threatens U.S. forces in the region."²⁵⁶ While it is easy for intelligence analysts to focus on how China may seize Taiwan, a potential conflict between China and India cannot be neglected any longer. This analysis of China's military capabilities in comparison with the strongest air force in South Asia may assist American defense planners in developing a coherent military strategy with India that may help counterbalance China's aggressive military build up.

²⁵⁶ "CIA: China Buildup Tilting Balance," CNN.com, 17 February 2005. Retrieved from the Internet on 23 February 2005 at <http://www.cnn.com/2005/ALLPOLITICS/02/17/goss.china.reut/>.

V. CONCLUSION

A. INTRODUCTION

The stunning examples of airpower in the two Gulf Wars, Kosovo, and Afghanistan proved to the Indian civilian and military leadership the value of airpower.²⁵⁷ Thanks to the amazing growth of the Indian economy, the IAF is acquiring the weapon systems characteristic of a global aerospace force. The description and analysis of the IAF's robust modernization campaign highlights the IAF's ability to conduct lethal operations while transforming itself from an air force dedicated to air defense to one capable of global force projection. Pakistan and China are concerned about the motivations behind IAF's modernization efforts and already have begun to improve their own air capabilities in response to any conventional or nuclear contingency. The responses of Pakistan, in particular, indicate the lowering of the nuclear threshold in South Asia. On the other front, a potential arms race between India and China is anticipated.

The United States may be able to neutralize the damaging effects of India's military build-up by increasing its arms exports to both India and Pakistan. Specifically, the sale of American F-16s to both countries would fortify bilateral relation with the United States, maintain the fragile security balance in South Asia, and minimize China's influence in the region. This concluding chapter reviews the findings of this thesis and highlights certain implications of IAF modernization for U.S. policy makers and defense planners.

B. FINDINGS

The IAF began its program of modernization in the mid-1990s. Since then, the IAF has made significant progress in acquiring and developing sophisticated aircraft weapon systems to obtain complete conventional air superiority with the PAF while closing the gap on conventional capabilities with the PLAAF. The specific goals of "quick and lethal force" desired by the IAF leadership are easily identified by the IAF's latest acquisitions, including the Sukhoi Su-30MKI advanced combat fighter, the Phalcon airborne early warning system, and the IL-78 air-to-air refueler.²⁵⁸ While the IAF's

²⁵⁷ Singh, *Indian Defence Yearbook 2004*, 330.

²⁵⁸ Ibid.

acquisition and integration of these three platforms will act as force multipliers in any conventional contingency, they have limited utility in a nuclear role (except for the Su-30MKI). Furthermore, the modernization of the IAF is not exclusively focused on these three platforms also is devoted to upgrading the IAF's multi-role fighters, UAVs, and air defense system in order to maintain air superiority in South Asia while projecting air power beyond India's traditional periphery.

Pakistan remains economically and politically constrained and will be unable to considerably upgrade its air force's conventional capabilities in the immediate future without significant foreign assistance. The United States has provided Pakistan with military equipment and training to fight terrorism (C-130s, Bell helicopters and surveillance radars) and is considering the sale of additional F-16s to its newly designated "major non-NATO ally."²⁵⁹ The United States has the unique opportunity to limit the amount of Sino-Pakistani military cooperation in the future by providing Pakistan with F-16s. If the United States provides Pakistan with F-16s, Washington needs to consider providing India with a sophisticated multi-role fighter, such as the F-16, so as not to endanger the emerging Indo-American strategic partnership. The likelihood of U.S. military equipment to India has increased recently as India announced that it was planning a large purchase of sophisticated fighter jets presenting U.S. policymakers with a rare chance to maintain a perceived evenhandedness in arms sales to South Asia's two strongest militaries.²⁶⁰

China does not perceive the IAF modernization campaign as a significant threat. China is indifferent to IAF modernization since China perceives the United States, not India, as its primary opponent in the region. Furthermore, China is more concerned with reclaiming Taiwan so the structure of its air force is more concentrated on its coastal region than with its southern border along the Himalayas. Regardless, China will continue to provide Pakistan with arms to help it counter Indian conventional military superiority in South Asia, so as to keep India focused on Pakistan, and not China, which otherwise would be the focus of Indian national security concerns.

²⁵⁹ K. Alan Kronstadt, "Pakistan-U.S. Relations," *CRS Issue Brief for Congress*, 14 December 2004, 7.

²⁶⁰ Carla Anne Robbins, Greg Jaffe, and Jonathan Karp, "U.S. May Sell F-16s to India, Pakistan," *The Wall Street Journal*, 15 March 2005.

The modernization of the IAF enhances India's war-fighting capabilities but threatens Pakistan, which will further strengthen its nuclear and ballistic missile capability while pressuring the United States to provide it with additional F-16s. The wheels of modernization in the PLAAF have finally begun to pick up speed as China fortifies its military in order to deter Taiwanese independence but to also project power to defend its energy interests abroad. Without a serious American commitment to sell Pakistan F-16s, it is inevitable that the modernization of the IAF will further increase military ties between Pakistan and China. Furthermore, the strength of the Sino-Pakistani relationship depends heavily on the pace of IAF modernization. The sooner that the IAF is capable of integrating ISR, air-to-air refuelers, multi-role fighters, and credible transport aircraft into a true global aerospace force capable of network-centric warfare, the sooner Pakistan and China will increase conventional arms transfers, specifically ground/airborne early warning radars, multi-role fighters, and UAVs

C. IMPLICATIONS AND RECOMMENDATIONS

Of particular concern for U.S. policymakers and defense planners is how the IAF's successful modernization may embolden India to conduct quick, offensive air operations against Pakistan over the contested Kashmir region, lowering the nuclear threshold in South Asia. Thus, it is in the best interest of the United States to manage a potentially destabilizing security threat in the region by providing Pakistan with the technology necessary to improve its weak conventional airpower so that Pakistan will not immediately resort to nuclear weapons. The sale of F-16s to Pakistan would not only reaffirm Washington's commitment to Pakistan as a "major non-NATO ally" dedicated to the War on Terrorism but dilute Beijing's influence over Islamabad. Another recommendation is to provide Pakistan with sophisticated airborne early warning capability, enhancing Pakistan's ISR capabilities to the point where India and Pakistan have the "eyes and ears" to monitor each other and not resort to the nuclear option due to poor intelligence.²⁶¹ In addition to security assistance, the United States should continue this strategic partnership in the War on Terror by providing Pakistan with the funding necessary to revive its economy while establishing credible educational and democratic institutions.

²⁶¹ Feroz Khan (Brigadier General (Ret.), Pakistan Army), discussion with author, 24 March 2005.

In respect to India, the United States should continue bilateral and multilateral military exercises tailored to promote India's emergence as a regional military force capable of countering a militarily strong China. With the successes in the Joint Indo-American and multi-national air exercises, Cope India and Cope Thunder, the IAF now perceives itself as a world-class air force²⁶² U.S. defense planners need to understand that India is content to increase training with other air forces since this supports its foreign policy of multilateralism. Since the United States has historically been an inconsistent geo-political partner, America's military to military cooperation with India will not improve unless Washington is willing to sell India advanced technology. If the United States is unable to fulfill the IAF's requirement of a multi-role fighter, then the IAF will keep its options open and increase training and arms purchases with other competitive air forces. For example, security cooperation between India and Israel is likely to grow more quickly than U.S.-Indian military cooperation if Washington does not start providing India with significant military sales opportunities.

The United States is just beginning to formulate a security assistance program with India and should take note of the modernization efforts listed in this thesis and tailor its military assistance accordingly. I not only recommend the sale of F-16s to India to fulfill its multi-role fighter requirement, but also recommend improving India's poor medium-lift transport capability.²⁶³ Also, if the United States wants to pursue its Ballistic Missile Defense (BMD) initiative in Asia, it will need to focus on the pros and cons of selling India the PAC-III missile defense system. Islamabad's greatest fear of Indo-American missile defense cooperation is that Indian political-military behavior will become more pugnacious under a BMD umbrella encouraging Indian pre-emptive air strikes into Pakistan.²⁶⁴ Pakistan may respond to an Indian BMD capability by increasing its SRBM and MRBM

²⁶² According to the Indian Air Force's official homepage at <http://indianairforce.nic.in/Cope.htm> the exercise Cope India was a success from day one as U.S. Air Force personnel were very impressed by the IAF's flying capabilities and professionalism. According to the team leader of the U.S. Air Force contingent, Col. Greg Newbech, "What we've seen in the last two weeks is that the IAF can stand toe-to-toe with the best Air Force in the world." Last accessed March 2005.

²⁶³ During Aero-India 2005, the United States showcased the Lockheed Martin C-130J Super Hercules since the IAF is seeking to modernize its air mobility (paratroops and cargo transport) capabilities. The IAF has been unable to fill the vacancy caused by the retirement of its medium transport An-12 fleet and its aging inventory of An-32s (expected to be phased out by 2014). From Ravi Sharma's, "A Display of Air Power," *Frontline*, 26 February to 11 March 2005, Vol. 22.

²⁶⁴ Adam Ward and James Hacket (ed.), "The Impact of Missile Defense in Asia: The Dilemmas of Transition," *IISS Strategic Comments*, July 2004, Vol. 10, No. 6, www.iiss.org/stratcom.

production in order to protect its aircraft in the event of an Indian air attack.²⁶⁵ I argue that the United States should not pursue a BMD capability in South Asia since this will severely threaten the fragile security balance in the region. Instead, the United States can foster stability in the region by encouraging the non-deployment of nuclear weapons and bolstering the conventional capabilities of both countries to the point where they deter the other.²⁶⁶

It would be naïve to not take into consideration the influence of the American military industrial complex when developing recommendations for arms sales to either Pakistan or India. Lockheed Martin has been pushing Washington on the dual sale of F-16s to Pakistan and India because unless orders are received by October 2005 it will have to begin shutting down its production line late this year.²⁶⁷ Since it takes three years to build an F-16, some work would continue at the facility through 2008.²⁶⁸ Furthermore, American defense companies are eager to enter the Indian defense industry in order to access cheap Indian labor and possibly increase sales to India's growing military (a role traditionally fulfilled by Russia). In fact, the tentative F-16 plan calls for the United States to sell Pakistan two dozen F-16s (built at Lockheed's Texas plant) while the Indians could buy as many as 125 F-16s with the first dozen jets built in the United States then production shifting to India.²⁶⁹

While it is extremely important for Washington to re-evaluate potential arms sales to South Asia, it is also important for U.S. policymakers to realize the rapid technological advances taking place in the IAF. Specifically, the rapid, technological development of the IAF explained here are designed for the U.S. Congress to take note of a militarily strong India and reconsider its proposed funding cuts for the United States Air Force's most

²⁶⁵ Feroz Khan (Brigadier General (Ret.), Pakistan Army), discussion with author, 24 March 2005.

²⁶⁶ Ibid

²⁶⁷ Robbins, Jaffe, and Karp, "U.S. May Sell F-16s to India, Pakistan."

²⁶⁸ Ibid.

²⁶⁹ Ibid. The F-16's fuselage, containing the aircraft's most sensitive electronics equipment, would continue to be made in the United States, according to a U.S. defense-industry official.

advanced combat fighter of the future, the F/A-22 Raptor.²⁷⁰ The United States has always been at the forefront of aviation innovation, but continued to cuts to the Air Force's next generation fighter may have catastrophic repercussions for America's national security in any large-scale conventional or nuclear war that may present itself.

Pakistan and China are very concerned about IAF modernization, yet there have been no major wars in the subcontinent since India began modernizing its military in the late 1990s. Instead of assuming that the IAF's modernization will further destabilize the region, I argue that the United States now has a unique opportunity to manage the security situation in the subcontinent. With the careful and deliberate sale of F-16s to both India and Pakistan, Washington can limit Sino-Pakistani military cooperation, strengthen the strategic bilateral relationship with both countries, and maintain an "airpower imbalance status quo" in South Asia whereby Pakistan does not immediately resort to nuclear weapons in respect to India's conventional superiority.

²⁷⁰ Laura M. Caolarusso examines the future of the U.S. Air Force in, "The Fight to Stay on Top," *Air Force Times*, 7 February 2005, 16. She argues that the U.S. Air Force is in jeopardy of losing its status of air dominance and questions how prepared it is to fight the next war. For example, just as the F/A-22 Raptor nears full-rate production, the Pentagon is now considering cuts that would reduce the Air Force's next generation fleet to 180 planes yet senior ranking service officials still insist that they need at least 381 Raptors to maintain air dominance.

LIST OF REFERENCES

“6 IAF Jaguars To Take Part in ‘Cope Thunder 2004,’” *Rediff.com*, 15 June 2004, <http://www.rediff.com/news/2004/jun/15iaf.htm>. Last accessed January 2005.

“A Thaw in India-China Relations,” *South Asia Monitor, Center for Strategic and International Studies*, 1 September 2003, www.csis.org/saprogram/sam/sam62.pdf.

“Air Force, India,” *Jane’s Sentinel Security Assessment*, 01 February 2005, www.janes.com. Last accessed January 2005.

“Arrow 2 Theater Ballistic Missile Defence System, Israel,” *Army-Technology.com*, <http://www.army-technology.com/projects/arrow2/>. Last accessed March 2005.

“Article Examines Purchase of Israeli Radar Against India’s Air Defense Network,” *Institute of Peace and Conflict Studies*, 23 March 2004, FBIS.

“Background Notes: Pakistan,” *United States Department of State: Bureau of South Asian Affairs*, <http://www.state.gov/r/pa/ei/bgn/3453.htm>. Last accessed January 2005.

“Biggest ever Indo-US Joint Air Exercise Begins,” *Outlook India.com*, 16 February 2004, http://www.outlookindia.com/pti_news.asp?id=201813. Last accessed January 2005.

“Britain to Deliver First Hawk to India by Aero India 2007,” *Deccan Herald*, <http://deccanherald.com/deccanherald/feb082005/i18.asp>. Last accessed February 2005.

“China and the Nuclear Tests in South Asia,” *China Profiles*, as found on the Nuclear Threat Initiative Homepage at <http://www.nti.org/db/china/nsascris.htm>. Last accessed March 2005.

“China’s Air Force,” *Jane’s Sentinel Security Assessment – China and Northeast Asia*, 27 May 2004, www.janes.com. Last accessed July 2004.

“CIA: China Buildup Tilting Balance,” *CNN.com*, 17 February 2005. Retrieved from the Internet on 23 February 2005 at <http://www.cnn.com/2005/ALLPOLITICS/02/17/goss.china.reut/>.

“External Affairs: Pakistan,” *Jane’s Sentinel Security Assessment*, South Asia, 20 Feb 2004.

“F-15s Head Home From Indian Joint Exercise,” *Air Force Times*, 08 March 2004.

“HK Daily: PLA’s Early Warning Aircraft Possess ‘Serious Threat’ to Taiwan,” *Hong Kong Tai Yang Pao* (Internet Version) in Chinese, 05 April 2004, FBIS.

“IAF Inducts Il-78 Midair Refuelers,” *Rediff.com*, 04 March 2003, www.rediff.com. Last accessed July 2004.

“IAF Sounds Fighter Makers,” *Deccan Herald*, 08 February 2005, <http://deccanherald.com/deccanherald/feb082005/i3.asp>. Last accessed February 2005.

“India Air Force to Phase out MiG-21 Trainer Aircraft,” *Xinhua News Service Agency*, 14 June 2004.

“India and Pakistan’s Nuclear Capabilities,” derived from the *Deadly Arsenals-Tracking Weapons of Mass Destruction* book by Joseph Cirincione, Jon B. Wolfshtal, and Miriam Rajkumar, Carnegie Endowment for International Peace, 01 June 2002, <http://www.ceip.org/>. Last accessed June 2005.

“India Armed Forces,” *Jane’s Sentinel Security Assessment*, South Asia, posted 16 April 2004, www.janes.com. Last accessed June 2004.

“India Armed Forces,” *Jane’s Sentinel Security Assessment*, South Asia, posted 16 April 2004, www.janes.com. Last accessed June 2004.

“India Seeks Uzbek-Made Aircraft to Enhance Capability Against China,” *BBC Monitoring International Reports*, 03 September 2002.

“India to Build Russian Jet Fighter,” *BBC News*, 15 November 2002, <http://news.bbc.co.uk/2/hi/business/2479781.stm>. Last accessed January 2005.

“India, Israel, Russia Sign Phalcon Radar Deal,” *HindustanTimes* Online, New Delhi, 10 October 2003, <http://www.hindustantimes.com>. Last accessed June 2004.

“India, US Increase Defense, Antiterror Links,” *Washington Times*, 05 June 2004, www.washingtontimes.com. Last accessed July 2004.

“India’s Air Force Scraps Outdated Jets,” *BBC News Online*, 09 November 2002, www.bbc.com.

“India’s Western Border Still a Hot Spot: Air Force Chief,” *Pakistan Press International Services Limited*, 20 November 2003, <http://www.nexis.com/>. Last accessed July 2004.

“Israel Will Sell Radar to India,” *STRATFOR*, 01 March 2004, <http://www.stratfor.biz>. Last accessed June 2004.

“Japan’s Ties to China: Strong Trade, Shaky Politics,” <http://www.nytimes.com/2005/02/22/international/asia/22japan.html>. Last accessed February 2005.

“Kashmir Region” graph retrieved from the CIA’s website, www.cia.gov. Last accessed January 2005.

“Natural Resources Defense Council Nuclear Notebook: China’s Nuclear Forces 1999,” *The Bulletin of the Atomic Scientists*, May-June 1999, from Paul Godwin’s, “China’s Nuclear Forces: An Assessment,” in *Current History*, September 1999, 260.

“Newly Raised Squadron of ‘Air Refueler’ Il-78 Will be Based at Agra,” *New Delhi The Asian Age*, in English, 16 Feb 2003, FBIS.

“NUCLEAR ANXIETY; Indian’s Letter to Clinton on the Nuclear Testing,” *New York Times*, 13 May 1998, Section A, 14.

“Pakistan Aeronautical Complex,” *Jane’s Defense Industry*, 12 January 2004.

“Pakistan Air Force Chief Expects F-16s From U.S.,” *Dawn*, 15 September 2004.

“Pakistan Buys Fleet of Mirage Jets from Libya,” *Agence France-Presse Islamabad*, 06 July 2004, <http://www.defensenews.com/>. Last accessed January 2005.

“Pakistan PM Aziz Leaves for China, Says Strategic Ties Major Influence in Region,” *Islamabad PTV World in English*, 14 December 2004, FBIS Transcribed Text, SAP2004121000050.

“Pakistan Pursues Deterrent Capability in Conventional and Strategic Areas: PM,” *Xinhua News Agency – CEIS*, 13 January 2005.

“Pakistan to Receive Swedish ERIEYE AEW&C System and SAAB Aircrafts,” 14 July 2004, http://www.pakistanidéfence.com/news/FullNews/2004/July2004/AWECS_DEAL.htm. Last accessed January 2005.

“Pakistan Vows to Match India over Israeli Radar Deal: World Community’s Help Sought,” *Dawn Online*, 11 November 2003, <http://www.dawn.com>. Last accessed June 2004.

“Russia’s Irkut About to Complete Su-30MKI Deliveries to India, Start Production at HAL Enterprises,” English compilation of reports from the website of Moscow Voyennykh Novostey, 11 May 2004. Accessed from the Foreign Broadcast Information System (FBIS) portal at <https://portal.rccb.osis.gov/> on January 2005.

Secretary of Defense, “Annual Report on the Military Power of the People’s Republic of China,” July 2003.

“Singapore and India Hold Inaugural Bilateral Air Exercise,” RSAF’s official website <http://www.mindef.gov.sg/rsaf/alert/ne-na-tpl.asp?newsid=121>. Last accessed January 2005.

“Six IAF Jaguars to Take Part in ‘Cope Thunder 2004,’” *Rediff Online*, www.rediff.com. Last accessed January 2005.

“Su-30 Provided Punch and License Prospects,” *Jane’s Defense Weekly*, 12 February 1997, 29.

“Turning the Tide: India Inches Closer to UNSC Seat,” *The Economic Times*, 10 February 2005, <http://economictimes.indiatimes.com/articleshow/1017425.cms>. Last accessed February 2005.

“Uzbekistan’s Aviation Industry Booms,” BBC Online, 18 December 2001, <http://news.bbc.co.uk>. Last accessed July 2004.

2002-2003 *Annual Report, Ministry of Defense. Government of India*. Indian Ministry of Defence’s official website: <http://mod.nic.in/>. Last accessed March 2005.

2003-2004 *Annual Report, Ministry of Defence, Government of India*. Indian Ministry of Defence’s official website: <http://mod.nic.in/>. Last accessed March 2005.

A.K. Sachdev, “Modernization of the Chinese Air Force,” *Strategic Analysis: A Monthly Journal of the IDSA*, Vol. 23, No. 6, September 1999.

A.K. Sachdev, “Modernization of the Chinese Air Force,” *Strategic Analysis: A Monthly Journal of the IDSA*, Vol. XXIII, No. 6, September 1999.

Abbas Mirza, “The Pakistan Air Force and its Development,” *Military Technology*, May 2002, Vol. 26, No. 5; Military Module.

Adam Ward and James Hacket (ed.), "The Impact of Missile Defense in Asia: The Dilemmas of Transition," *IISS Strategic Comments*, July 2004, Vol. 10, No. 6, www.iiss.org/stratcom. Last accessed March 2005.

Air Commodore Ramesh V. Phadke in his working paper for International Security and Cooperation (CISAC), Stanford University, entitled, "People's Liberation Army Air Force (PLAAF): Shifting Airpower Balance and Challenges to India's Security," February 2002.

Air Commodore Ramesh V. Phadke, "People's Liberation Army Air Force (PLAAF): Shifting Airpower Balance and Challenges to India's Security," February 2002.

Air Commodore Tariq M. Ashraf, Pakistan Air Force, "Doctrinal Awakening of the Indian Armed Forces," *Military Review*, November – December 2004.

Air Marshal Vinod Patney (Retd), "Modernizing the Armed Forces and Defence Budget," *Peace and Conflict*, Vol. 7, No. 9, September 2004.

Alan Vick, Richard M. Moore, Bruce R. Pirnie, John Stillion, *Aerospace Operations Against Elusive Ground Targets* (Santa Monica: RAND, 2001).

Andrew Koch, "Interview with Air Chief Marshal Kaleem Saadat, Pakistan Air Force Chief of Staff," *Jane's Defense Weekly*, 08 October 2003.

Ashley Tellis, *India's Emerging Nuclear Posture* (Santa Monica: RAND, 2001).

Ashok Kapur with A. Jeyaratnam Wilson, *The Foreign Policy of India and her Neighbors* (New York: St. Martin's Press, 1996).

Ayesha Siddiqa-Agha, *Pakistan's Arms Procurement and Military Buildup, 1979-1999* (New York: Palmgrave, 2001).

Bates Gill and Michael O'Hanlon, "China's Hollow Military," *The National Interest* No.53 (Summer 1999).

Biman Mukherji, "India and Israel Sign One Billion Dollar Defense Deal," *Agence France Presse*, 05 March 2004, <http://www.nexis.com>. Last accessed July 2004.

Biman Mukherji, "India and Israel Sign One Billion Dollar Defense Deal," *Agence France Presse*, 5 March 2004.

Brian Cloughley, "India's and Pakistan's Air Power Potential Hindered by Lack of Joint Headquarters," *Jane's International Defense Review*, 01 July 1998.

Carla Anne Robbins, Greg Jaffe, and Jonathan Karp, "U.S. May Sell F-16s to India, Pakistan," *The Wall Street Journal*, 15 March 2005.

Chris Smith, *India's Ad Hoc Arsenal: Direction or Drift in Defense Policy* (New York: Oxford University Press, 1994).

Christopher Jaffrelot (editor), *A History of Pakistan and its Origins* (London: Wimbledon Publishing Company, 2002).

Colonel (Retired) Vyacheslav Vladimirovich Baskakov and Captain First Rank (Retired) Aleksandr Fedorovich Gorshkov, "The PLAAF is Winning the Skies," *Moscow Nezavisimoye Voyennoye Oborzeniye*, 27 February 2004, FBIS Translated Text, CEP20040227000353.

Comments from Lieutenant General Tariq Waseen Ghazi, Director of the Pakistani National Defense College, in a visit to the Naval Postgraduate School on 15 September 2004.

David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects* (Berkeley: University of California Press, 2002),

David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects* (Berkeley: University of California Press, 2002), 280.

Doctrine of the Air Force, Air Headquarters, New Delhi, October 1995, referenced in V.R. Raghavan's, "Limited War and Nuclear Escalation in South Asia," from *The Nonproliferation Review*, Vol.8, No. 3 (Fall-Winter 2001).

Dr. Subhash Kapila, "China's Quest for Strategic Co-operation with India: Perspectives," *South Asia Analysis Group*, 24 February 2004, <http://www.saag.org/papers10/paper936html>. Last accessed February 2005.

Elisabeth Bumiller, "Bush Voices Concern on Plan to Lift China Arms Embargo," *New York Times*, 22 February 2005, www.nytimes.com. Last accessed February 2005.

Fakir Chand, "IAF Draws Lessons from Gulf War," *Rediff.com*, 27 June 2003, <http://www.rediff.com/news/2003/jun/27iaf.htm>. Last accessed January 2005.

Farah Naaz, "Indo-Israel Military Cooperation," *Strategic Analysis: A Monthly Journal of IDSA*, August 2000, Vol. 24, No. 5.

Feroz Khan (Brigadier General (Ret.), Pakistan Army), discussion with author, 24 March 2005.

FC-1/JF-17 Multirole Fighter Aircraft," *Sino Defense*, <http://www.sinodefence.com/airforce/fighter/fc1.asp>. Last accessed January 2005.

Fu Xiaoqiang and Kuang Ji, "Avoiding the Clash: Paving the Way for Sino-Indian Cooperation," *Beijing Review*, November 13, 2003, 44.

George K. Tanham, *Indian Strategic Thought: An Interpretive Essay* (Santa Monica: RAND, 1992).

Government of India's High Commission website, http://indiahighcom.intnet.mu/prl_7.htm. Last accessed January 2005. The inaugural

Hans M Kirstensen and Shannon N Kile, "Nuclear Arms Control, Non-Proliferation and Ballistic Missile Defense", SIPRI Yearbook 2003, p.620, from Major General Dipankar Banerjee's (Retd) Draft Paper, "India-Pakistan-China-A Nuclear Arms Race in Asia?" Major General Dipankar Banerjee is the Director, Institute of Peace and Conflict Studies, an independent and autonomous research institution, New Delhi, India, <http://www.eias.org/conferences/>. Last accessed July 2004.

Hans M. Kirstensen and Shannon N. Kile, "Nuclear Arms Control, Non-Proliferation and Ballistic Missile Defense", 620.

Indian Air Force, Bharatiya Vayu Sena website, <http://www.bharat-rakshak.com/IAF/> Last accessed January 2005. Su-30MKIs from No. 20 Lightening Squadron.

Indian Air Force's official homepage at <http://indianairforce.nic.in/Cope.htm>. Last accessed January 2005.

Indian Air Force's official homepage at <http://indianairforce.nic.in/Cope.htm>. Last accessed March 2005.

Interview with PAF Group Captain Khawar Hussein on 17 March 2004, Naval Postgraduate School.

Jasbir Singh, ed. *The Indian Defense Yearbook 2004* (New Delhi: Natraj Publishers, 2004).

Jay Bushinksy, "Radar System Sale to India Approved," *The Washington Times*, 02 March 2004, <http://washingtontimes.com/world/20040301-100359-6990r.htm>. Last accessed January 2005.

Jian Yaping, "Dai Bingguo Says There Are Vast Prospects for Sino-Indian Cooperation," *Beijing Xinhua Domestic Service*, 30 July 2004, FBIS Translated Text, FBIS Document Number: FBIS-CHI-2004-0730.

Jian Yaping, "Dai Bingguo Says There Are Vast Prospects for Sino-Indian Cooperation."

John Wilson Lewis and Xue Litai, "China's Search for a Modern Air Force," *International Security*, Vol.24, No.1 (Summer 1999), 82.

K. Alan Kronstad, Foreign Affairs, Defense, and Trade Division, "Pakistan – U.S. Relations," *Congressional Research Service, The Library of Congress*, updated 2 December 2003, <http://islamabad.usembassy.gov/wwwwhott.html>, CRS-7. Last accessed January 2005.

K. Alan Kronstadt, "Pakistan-U.S. Relations," *CRS Issue Brief for Congress*, 14 December 2004, 7.

Kamran Khan and John Pomfret, "U.S. Extended Presence Agreed to by Pakistan; Air Base to Serve as Key Facility in Region," *The Washington Post*, 14 December, 2001.

Keith Bradsher, "India Joins China in Stepped-Up Thirst for Oil," *International Herald Tribune Online*, <http://www.iht.com/articles/2005/02/17/news/energy.html>. Last accessed February 2005.

Kenneth Allen, Krumel, Pollak, *China's Air Force Enters the 21st Century* (Santa Monica: RAND, 1999), 106.

Kronstad, K. Alan, Foreign Affairs, Defense, and Trade Division, "India-U.S. Relations," *Congressional Research Service, The Library of Congress*, 3 December 2003.

Laura M. Caolarusso, "The Fight to Stay on Top," *Air Force Times*, 07 February 2005.

Laura M. Caolarusso, "The Fight to Stay on Top," *Air Force Times*, 7 February 2005,

Leo E. Rose, "India and China: Forging a New Relationship," in Shalendra D. Sharma (ed.), *The Asia-Pacific in the New Millennium: Geopolitics, Security, and Foreign Policy* (Berkeley, CA: Institute of East Asian Studies, University of California, Berkeley, 2000), 224-238 cited in *India's Emerging Nuclear Posture*, ed. Ashley Tellis, 733.

Liao Yameng, "Expert Analyzes the 'Balancing' Strategies of China, India, and Pakistan," 7 Nov 2003, *Hong Kong Wen Wei Po* (Internet Version), FBIS Translated Text, FBIS-CHI-2003-1107.

Lieutenant General (Retired) Sardar F.S. Lodi and Jamie Al-Nasir, "An Introduction to the Pakistan Air Force," http://www.pakaviation.com/PVA/Library/Docs/the_paf.html. Last accessed January 2005.

Lt. General RK Jasbir Singh, ed., *Indian Defence Yearbook 2004* (Dehra Dun, India: Natraj Publishers, 2004), 330.

Lyman Miller, NS 3667 Chinese Foreign Policy Handout, "Comparing Traditional Chinese, Marxist-Leninist, and Western Worldviews," 5.

Maj. James Law, "Cope India Brings Out Fighter Ops," *Pacific Air Forces Public Affairs*, <http://www.bharat-rakshak.com>. Last accessed July 2004.

Marco Di Capua, "Nuclear Security in Asia: A Global Affair," *Proliferation Prevention and Arms Control Program*, Lawrence Livermore National Laboratory, September 2000, as submitted to the Seventh ISODARCO-Beijing Seminar on Arms Control, Xi'an China, October 8-12, 2000, 3.

Marcus P. Acosta, "High Altitude Warfare: The Kargil Conflict and the Future," *Naval Postgraduate School Thesis*, June 2003.

Marcy Agmon and George K. Tanham, *The Indian Air Force: Trends and Prospects* (Santa Monica, California: RAND, 1995).

Mark Stokes, China's Strategic Modernization: Implications for the United States.

Ministry of Foreign Affairs of the People's Republic of China, 14 May 1998, as found on the NGO Committee on Disarmament, Peace and Security homepage at <http://disarm.igc.org>.

Mohammed Ahmedullah, "India Enters Fighter 'Big League,'" *Military Technology*, 27, 2 (February 2003).

New Priorities in South Asia: U.S. Policy Toward India, Pakistan, and Afghanistan, Chairmen's Report of an Independent Task Force Cosponsored by the Council on Foreign Relations and the Asia Society (New York: Council Foreign Relations, Inc, 2003), 1.

Peter R. Lavoy and MAJ Stephen A. Smith, "The Risk of Inadvertent Nuclear Use Between India and Pakistan," *Strategic Insights*, Volume II, Issue 2, February 2003, <http://www.ccc.nps.navy.mil/si/feb03/southAsia2.asp>. Last accessed June 2005.

Peter R. Lavoy, "Fighting Terrorism, Avoiding War The Indo-Pakistani Situation," *Joint Forces Quarterly*, Autumn 2002.

Peter R. Lavoy, *Learning to Live with the Bomb? India and Nuclear Weapons, 1947-1974* (New York: Palgrave-MacMillan, forthcoming).

Photo of IAF Jaguar, <http://homepage.mac.com/topcover/PhotoAlbum46.html>. Last accessed March 2005.

Prasun K. Sengupta, "Which Way is India's BMD/AEW System Headed?" <http://www.indiadefence.com/BMD&AEW.htm>. Last accessed March 2005.

Pulkit Singh, "India Bolstering Jaguar Fleet, Phasing Out Some Older MiGs," *Journal of Electronic Defense*, October 2002, Vol. 25, Iss. 10.

Pulkit Singh, "India Orders More UAVs From Israel," *Journal of Electronic Defense*, January 2005, Vol. 28, No. 1, 21.

R. Sukumaran, "The 1962 India-China War and Kargil 1999: Restrictions on the Use of Air Power," *Strategic Analysis: A Monthly Journal of the IDSA*, Vol. XXVII, No. 3, July to September 2003.

Ravi Sharma's, "A Display of Air Power," *Frontline*, 26 February to 11 March 2005, Vol. 22.

Robert A. Manning, Ronald Montaperto, and Brad Roberts, *China, Nuclear Weapons, and Arms Control*.

Robert G. Sutter, *Chinese Policy Priorities and Their Implications for the United States* (Maryland: Rowman and Littlefield, 2000).

Robert Marquand, "India and Pakistan – Now Pausing to Rearm? Kashmir Conflict Leaves both Countries Questioning the Quality of their Weapons," *Christian Science Monitor*, 14 July 1999.

Robert Powell's article "Crisis Stability in the Nuclear Age," *American Political Science Review*, Vol. 83, No. 1, March 1989

Rodney W. Jones, "Force Modernization Trends-India and Pakistan," 23-25 October and Military Asymmetry and Instability in Emerging Nuclear States: India and Pakistan, March 2002 from Peter R. Lavoy and Major Stephen A. Smith's "The Risk of Inadvertent Nuclear Use Between India and Pakistan," (03 February 2003), *Strategic Insight*, Center for Contemporary Conflict), at <http://www.ccc.nps.navy.mil/>. Last accessed January 2005.

Rodney W. Jones, "Strategic Stability and Conventional Force Imbalance: Case of South Asia," *Policy Architects International*, http://www.bradford.ac.uk/acad/sassu/publications/StrStab&ConvAsymmetry_Bradford_2.pdf. Last accessed January 2005.

Sayan Mazumdar, "Phalcon AWACS and In Flight Refueling," *India Defense Consultants*, 24 December 2002, <http://www.indiadefence.com>.

Secretary of Defense, "Annual Report on the Military Power of the People's Republic of China,"

Shishir Gupta, "India's Military Commanders Finalize 'New' War Doctrine," *The Indian Express*, 06 March 2004, FBIS, SAP20040306000005.

Stephen Philip Cohen, *India: Emerging Power* (Washington, D.C.: Brookings Institution Press, 2001).

Sudha Ramachandran, "India Signs on as Southeast Asia Watchdog," *Asia Times Online*, 05 April 2002, <http://www.atimes.com/ind-pak/DD05Df01.html>. Last accessed July 2004.

Sumit Ganguly, *Conflict Unending: India-Pakistan Tensions Since 1947* (New York: Colombia University Press, 2001).

Text of 13 May 1998 letter from Indian Prime Minister Vajpayee to U.S. President Clinton, posted on the Embassy of India, Washington D.C. website located at <http://www.indianembassy.org/indusrel/pmletter.htm>. Last accessed March 2005.

Ts'ai Chih-ch'eng, "Chinese and Indian Navies Conduct Joint Search-and-Rescue Exercise in East China Sea," *Hong Kong Ta Kung Pao* (Internet Version), 15 November 2003, FBIS Translated Text, CPP20031115000027.

V.R. Raghavan, "Limited War and Nuclear Escalation in South Asia," *The Nonproliferation Review*, Vol. 8, No. 3 (Fall-Winter 2001).

Xiao Zhou, "India's Great Economic Potential," *Beijing Review*, 13 November 2003.

Xue Litai and John Wilson Lewis, "China's Search for a Modern Air Force," *International Security*, Vol.24, No.1 (Summer 1999).

Zhang Nongke and Weng Huainan, "A Leap Over the Past 50 Years – Viewing Development in the People's Air Force From the Four Grand Military Parades," *Beijing Renmin Ribao Overseas Edition*, 11 November 1999, FBIS Translated Text, FTS199911121000870.

THIS PAGE INTENTIONALLY LEFT BLAN

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
Ft. Belvoir, Virginia
2. Dudley Knox Library
Naval Postgraduate School
Monterey, California
3. CAPT Steven B. Ashby, USN
Naval Postgraduate School
Monterey, California